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COMPUTERWORLD

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NEWSPAPER

Switch is on to less costly virtual nets

By John Dix
CW Staff

Long-distance telecommunications carriers are developing a service alternative to leased lines that will use the switched network and will cost less than leased facilities, but will initially lack the performance of dedicated lines, particularly for data transmission.

Known by many names — software-defined networks, virtual networks or equivalent networks — the basic concept involves enhancing switched, long-distance telephone systems to provide services that are functionally similar to private lines.

Explaining the plans of AT&T, Roy Weber, division manager of service concepts at AT&T Communications, said, "[We will] take the intelligence that we've already put in the network and alter it a bit through software changes to allow for virtual networks — networks kept in memory. Customers will never really own a wire in the network; they'll own it in software."

Weber went on to explain that this capability

See **NETS** page 4

MICRO DEBUTS

Sperry offers micro network for MS-DOS

By Eric Bender
CW Staff

BLUE BELL, Pa. — Sperry Information Systems Group last week introduced Usernet, a local-area network for Sperry Corp. micros and other personal computers that run Microsoft Corp.'s MS-DOS operating system.

Usernet, Sperry's first entry into the personal computer network market, will offer customers "an opportunity to share information and programs and to minimize their investment in expensive hard disk drives and other peripherals," commented Wayne Walther, product director.

In addition to demand for personal computer nets in large companies, Walther noted that "quite a number of proposals in the federal market are asking

See **SPERRY** page 8

DG unleashes portable

By Eric Bender
CW Staff

NEW YORK — Data General Corp. last week unveiled a 9-lb portable system said to offer all the functions of desktop personal computers and to be fully software-compatible with IBM microcomputers.

The Data General/One personal system was touted as the first commercial briefcase-size machine to feature the 25-line by 80-char. display, standard on desktop machines, and to operate for a full working day under battery power.

Company officials claimed that the system will remove the performance limitations separating earlier briefcase-size personal computers and desktop models.

"Surrendering the full functionality of a desktop in order to have computer mobility is a thing of the past," DG President Edson de Castro maintained.

The system's 8½-in. by 6¾-in. LCD

See **DG** page 8

TOP OF THE NEWS

Illegal entry. In its continuing attack on computer crime, the U.S. House of Representatives approved a bill that will stiffen the penalties for illegally tapping medical records with any telecommunications device. **Page 2.**

■

IBM unveiled two high-end 3880 disk controllers, both field-upgradable from selected older models. **Page 5.**

■

Reaping the harvest. A report predicted the electronic products service market will double by decade's end, providing users with greater bargaining power in arranging service contracts. **Page 9.**

■

Managers were treated to a slew of product announcements at the annual Telecommunications Association conference, while *Computerworld* gathered opinions on corporate telecommunications policies and on IBM's cabling scheme. **Page 10.**

■

AT&T Information Systems will form its own credit corporation to finance lease deals for its computers and communications equipment in an effort to boost sales of new AT&T machines. **Page 14.**

■

Honeywell, Inc. announced two office systems that are based on its DPS 6 minicomputer and are said to support up to 34 users. **Page 95.**

■

Tough climb ahead, Mac. Apple Computer, Inc. recently upgraded memory capacity on its Macintosh and pressed Apple's drive into the corporate environment, but analysts remain skeptical on how effective the company's Fortune 1000 strategy will be. **Page 99.**

■

FYI

Public software: Spirit of giving

By John Gallant
CW Staff

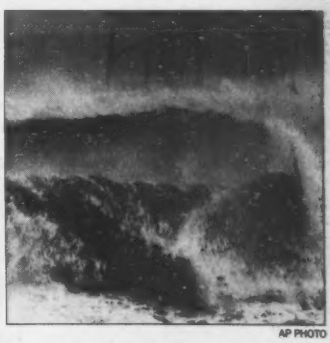
Did you ever wonder what happened to all those kids who spent their youths collecting and swapping baseball cards?

Well, at least some of them grew up to become computer enthusiasts who now write, trade and maintain their own personal libraries of public domain software — an increasingly popular, inexpensive form of software that many advocates say is an alternative to commercial products.

"The concept of public domain software has the same flavor as trading in baseball cards. It embodies the same spirit of sharing," said Douglas Chamberlin, coordinator for the Boston Computer Society's IBM Users Group Software Exchange Library. "The difference is that you can make the baseball cards yourself. You can develop the packages you want rather than searching around to find the ones you do not have. It is a self-generating activity that is very useful to the computer user and fun at the same time."

A number of factors have fueled the growing interest in software in the public domain, which, as its name implies, is software that authors have given to the public to copy and use freely (see story page 6). Those factors include the advent and rapid expansion of users groups

See **SOFTWARE** page 6



AP PHOTO

Sound and fury

DP shops battened down the hatches when Hurricane Diana lashed the North Carolina coast with 100-mph-plus winds and 18 inches of rain. Story page 7.

✓ House OKs bill outlawing medical file wiretaps

WASHINGTON, D.C. — The U.S. House of Representatives, again taking action to outlaw computer abuses, last week approved legislation to penalize unauthorized access or alteration of individual medical records through a telecommunications device.

The bill (H.R. 5831) was approved by a quick voice vote on Sept. 17. Its sponsor, Rep. Ron Wyden (D-Ore.), said the legislation fills "an enormous gap" in federal and state laws by protecting medical records kept by hospitals and other health-care providers from unauthorized access and tampering.

The U.S. Senate, however, has not approved similar legislation, so the Wyden bill may expire unless it is acted upon in the last few weeks of this session of Congress. Also awaiting Senate action is the broader House-approved computer crime bill (H.R. 5616) [CW, July 30].

Wyden indicated the legislation was spurred by last summer's computer break-in at the Memorial Sloan-Kettering Cancer Center in New York, in which hackers gained access to radiation treatment records for 6,000 past and present patients of the center.

"Luckily, no one was hurt — this time," Wyden said in a speech. "I believe that the problem of computer tampering with medical records is a disaster waiting to happen."

Wyden noted that the sentence given for the Sloan-Kettering break-in was two years' probation, which he called "a slap on the wrist for putting so many vulnerable patients at great risk."

The bill establishes a two-tier penalty system for persons who gain unauthorized access to medical records through a telecommunications device. If there is intent to obtain direct access to the records, it sets a penalty of up to $5,000 and/or one year in prison; if there is intent to alter the information, it sets a penalty of up to $25,000 and/or five years in prison.

The bill generally was supported by the American Hospital Association and the American Medical Records Association at committee hearings earlier this year [CW, April 16]. However, the U.S. Justice Department opposed it as too narrow in scope, preferring instead the more comprehensive approach taken by the administration's computer crime bill (S. 2940) [CW, Aug. 20].

On the House floor, Rep. Howard C. Nielson (R-Utah) said he supports the intent of the Wyden bill, but expressed the same reservations about the bill as did the Justice Department.

A spokesman for Wyden said the congressman is working with interested senators to see if the bill can be put on the Senate agenda for action before the 98th Congress adjourns.

The spokesman said House action was expedited when the House Judiciary Committee waived its jurisdiction in regard to the bill.

Raid nets micros said used in gambling ring

By Charles Babcock
CW New York Bureau

NEW YORK — An IBM Personal Computer and two Apple Computer, Inc. micros were among the office equipment allegedly used by bookmakers and seized in a gambling ring raid by police in New York and New Jersey last week.

Twenty-three people were arrested at 11 locations, and $30,000 in cash was confiscated, but it was the computers and their potential contents that intrigued police.

"This is the first time we have found a computer being used like this in New York City," said Capt. Brian F. Hillen. He said the desktop units were probably being used to calculate betting odds and to determine how the bookies should lay off bets.

Bookies lay off, or exchange bets with other bookies, to avoid having too many winners. When many customers bet the same way on a home team, the bookie distributes some of the bets to a counterpart in another city.

Calculating odds and laying off bets can be complicated, especially in a high-volume operation, and, Hillen said, the New York-New Jersey ring was one of the largest police had seen.

The IBM Personal Computer reportedly was being used at a one-man operation in a Manhattan apartment, and police believe they recovered it intact. The occupant of the apartment, Wilson Hurd, was seized along with $27,000 in cash and gambling records, Hillen said. Hurd was charged with promotion of gambling and possession of gambling records, felony charges punishable by up to four years in jail.

Police computer experts last week were preparing to examine the Personal Computer to see what kind of program it was running and what data was stored on the 20M-byte hard disk confiscated with the machine. Also confiscated were a printer and modem. Police estimated the value of the IBM system at $15,000. According to Hillen, a police computer expert said there appeared to be no kill switch on the Personal Computer.

Police said they also confiscated 90 floppy disks, which Hillen said police are treating the same as paper gambling records. The police and the district attorney are discussing which parts of computer programs and stored data might constitute evidence in a trial.

New Jersey State Police confiscated an Apple II and Apple III in raids, but it is not known whether the IBM and Apples were joined together in a network.

Call us

As hard as we try to give our readers the most complete information available, some good news and feature stories never reach us.

Are you involved in an unusual application of DP technology in your firm? Have you implemented successful cost-cutting strategies? Is something in your DP shop not working as designed? Know any unsung heroes? Heard any hot news about vendors? Are you aware of technology or management trends that the trade press is overlooking?

If so, we'd like to hear from you. *Computerworld* has established a reader hot line for information regarding items of interest to the computing community. Call us toll free at (800) 343-6474. Ask for Donovan White, assistant managing editor.

NEWS SUMMARY

After cutting prices on its 3880 line, IBM last week unveiled two high-end additions to the line/**5**

When Hurricane Diana hit the North Carolina coast recently, one information systems director learned what it meant to be prepared/**7**

The electronic products service market should double by 1990, providing equipment users with greater bargaining power over costs, a recent report indicated/**9**

CW at Telecommunications Association: As corporate telecommunications increase in importance, more companies are setting policies to govern telecommunications operations, specialists said . . . The jury is still out on the IBM Cabling System, as specialists polled here had a range of reactions to the wiring scheme . . . Communications vendors unveiled a host of products/**10-12**

Spoken notes are being attached to messages moving over one firm's electronic mail system, thanks to a new Texas Instruments, Inc. product/**13**

AT&T's recently announced marketing strategy includes used equipment resale and lease financing through a planned credit corporation; the company also announced upgrades to its Information Systems Network/**14**

Brownouts and blackouts do not affect the data center of a New York-based brokerage firm, thanks to the center's power-generating capacity/**15**

A speaker at the Conference on Administration and Control of Data Bases last week made a pitch for planning for an integrated data base/**16**

Product Spotlight: Computer-based training tools/**18-23**

Software/Expo 84: Micro-mainframe links and improved graphics were among the developments in software, visitors here said . . . Success in developing software has led to the quality crisis facing the industry today, asserted the Expo's keynote speaker/**24-25**

World Communications Conference '84: Talk here indicated regulations on transborder data flow are becoming a hotly debated issue . . . If policy-making processes can be speeded up and standardized, telecommunications will have a significant effect on economic and social developments, the conference's keynote speaker said . . .Two packet-switching standards are jockeying for recognition as the international standard . . . Worldwide growth is predicted for the computer/telecommunications market if Europe and the U.S. work together, two strategy sessions here concluded/**28-29,32-33**

The jury is still out on whether an AT&T Unix-based system is an appropriate choice for handling a company's information resource needs, according to a Unix Systems Expo/84 panel/**31**

Micro-mainframe links will radically change the face of DP and may disrupt shops that do not plan for the future, a recent study stated/**34**

Last year, Swedish banks officially adopted a magnetic security technology to secure the country's automated teller machines/**42**

Application development has made CICS programming a snap at an Alabama utilities company/**44**

An automated item-processing system is the cornerstone of a new Texas government money management policy/**50**

Going over budget convinced an oil firm to consider buying its own computer/**51**

One software firm used the remote computing resources of a time-sharing network to bring products to market/**52**

United Technologies Corp.'s Executive Personal Computer Training Program has so far taught 1,300 of its managers to use micros/**54**

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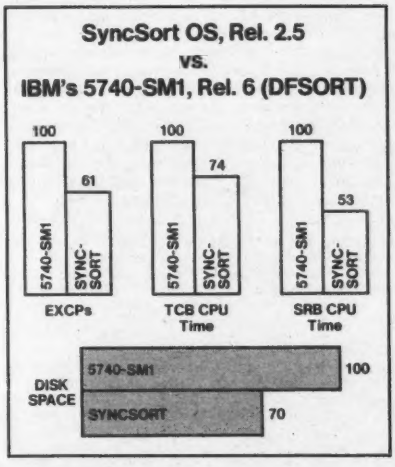
WORLD SERIES

SyncSort wins in four straight.

(SyncSort OS 2.5)

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Get a real star for your team.



As the major league of sorting prepares to crown the over-all champion, summer of 1984 will be remembered as the season of SyncSort's continuing dominance.

SyncSort, as usual, fielded a team of experienced veterans who could hit the long ball, run the bases aggressively, and score big performance wins. The 1984 SyncSort team also added some classy new stars whose versatility added to their team's victory in the Sort Series.

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To re-cap the strengths of this all-star team, let us examine their leadership in the critical areas of sorting.

FASTER SORT PERFORMANCE: New sorting techniques in SyncSort 2.5 make it the absolute performance leader as reflected in the charts at the lower left. SyncSort's performance advantages allow its users to handle an ever-increasing sort workload without increased impact on the system.

NEW PRODUCTIVITY FEATURES: SyncSort pioneered the use of sort utilities to eliminate many time-consuming tasks previously requiring much application or operations effort. Using the following features, 2.5 can sort, format and present data in any form a user requires.

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- **Record Formatting** — To existing features like INCLUDE/OMIT, INREC/OUTREC, SUM and others — all of which have been expanded — 2.5 adds new and useful capabilities like data conversion, editing, insertion of literals.
- **Multiple Output** — From a single sorted file, you can create multiple files and reports. Each can include the same or different data as determined by INCLUDE, OMIT, OUTFIL or OUTREC parameters.

CUSTOMER SERVICE: Syncsort customers are the best judges of SyncSort service. Those customers gave the following responses to International Data Corporation when queried about the service received: 97% rated SyncSort over-all customer services as good to excellent, with 78% rating it as very good or excellent.

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Rising costs spurring move from dedicated lines

The migration from leased lines to software-defined networks is expected to be driven by the rising cost of dedicated lines. While this is expected to happen over time, customers are already seeing prices climb in the form of new line fees, and significant rate increases are expected by the end of the year.

From the user's perspective, these price hikes are coming from two directions: Users have to start paying line fees to local telephone companies for dedicated facilities; rates will go up when the long-haul carriers move to compensate for the increasing cost of providing these facilities.

Private-line fees being levied on users by local telephone companies include customer-access line charges and private-line surcharges. The customer-access charge went into effect in May. Business customers with more than two telephone lines now pay, varying by state, up to $6 per month for every telephone line they have.

The private-line surcharge will become effective in mid-October. This requires customers to pay an additional $25 per month on each private line they operate, unless the lines qualify for exemption.

Exemption from the surcharge is dependent on a number of factors, but will, in general, be granted more often for private lines being used in data networks rather than voice networks, a spokesman for the Federal Communications Commission confirmed. This is because, more often than not, private lines used in voice networks are terminated in switches that are capable of rerouting calls back into the local-exchange network. This would enable other access charges to be bypassed, which the surcharge is meant to make up for.

An AT&T Communications spokesman said that the firm expects that the private-line surcharge will apply to less than half of its private-line subscribers.

Special access fees

Line fees aside, the cost of private lines will probably be increased the most when the long-haul carriers fold the cost of special access fees into their tariffs. These are the new charges that long-haul carriers will pay to local telephone companies for the right to connect their private lines to local systems.

After examining the access fees proposed by the National Exchange Carrier Association (representing most, but not all local companies) and other exchange carriers, the long-haul carriers filed new tariffs with the FCC that reflected these costs.

According to Bill Gallagher, director of major account marketing with MCI Telecommunications Corp., the proposed special-access tariffs are dramatically more expensive than what it used to cost for local access.

But the FCC, upon receiving new tariffs that called for rate increases ranging from 30%-50%, and in some cases more than 200%, delayed the adoption of the new tariffs. "We were concerned about passing on rates that weren't cost justified," an FCC spokesman said, "so we put out a notice that we needed additional information."

That information has since been gathered, and, the spokesman said, some decision should be made by mid-November.

Even if this decision only results in a call for more information, the inevitable conclusion is that special access is here to stay, and private-line costs will be increased to reflect that.

Joesph T. Massey, president of the consulting firm JTM Associates, Inc., said that the carriers will compensate for this cost by upping the channel-terminal charge component of their private-line rates.

"In many cases the cost per mile [for private lines] will go down, but the channel-terminal charges — which represent the real cost to the provider — will skyrocket," he said.

NETS from page 1

is an outgrowth of intelligence put into the network to provide enhanced calling card and toll-free services.

Most of the enhancements required are made at the network switch level. Bill Gallagher, director of major account marketing with MCI Telecommunications Corp., said that the continual addition of digital switches and digital transmission media to the MCI network will eventually enable the company to "create for customers who want it, a private network without leased lines."

Gallagher said that users will look to software-defined networks as the price of private lines climbs. These rates are increasing for a number of reasons. Gallagher cited as one, the long-distance carriers' increased cost of doing business with the local telephone companies.

To provide end-to-end private-line service, the long-haul carriers have to arrange with the local telephone companies at both ends of the line to complete the link to the customer. The local companies have filed special access tariffs that will substantially raise the price of this termination service. The tariff is scheduled for review by Nov. 13. If the tariff is approved as proposed, the cost of providing private lines will go up, and users can expect to see this reflected in their bills.

Another factor contributing to the increased price of private lines is the cost of maintaining these facilities. "By definition, private lines are a maintenance nightmare," noted Joseph T. Massey, president of the consulting firm JTM Associates, Inc. in Atlanta, Ga. This is due to the immediate nature of these line repairs as opposed to how problems with the switched network are handled. And it results in a "disproportionate amount of the maintenance labor force spread over a smaller circuit base, which jacks up the cost," Massey said.

Door will not slam

But carriers will not slam the door on private lines by increasing prices until they have a window somewhere else to open, Massey contended. In his opinion, that window is software-defined nets.

These networks, however, will not always offer a clear alternative to private lines, regardless of price. In particular, special heed will have to be given to whether the private line being replaced is used for voice or data communications.

According to Massey, when available, software-defined networks will be easier to justify for voice than for data. For voice, private lines are used in electronic tandem networks and other types of networks to save money. But as rates for directly dialed long-distance calls drop, the cost justification for the dedicated circuit is skewed.

Massey believes regular long-distance rates will drop severely, and he said that, at new prices, private lines will have to be really loaded up to save money. Software-defined networks and Wats are expected to offer users viable alternatives.

For data, the migration to virtual networks will require more painstaking study. Generally, the maximum speed supported over dial-up telephone lines is 4.8K bit/sec, too slow for most large users' needs and thus limiting as far as software-defined networks go.

The rate ceiling for switched facilities is, however, expected to be raised to 9.6K bit/sec or perhaps as high as 56K bit/sec, as long-haul carriers add digital switches and digital transmission facilities are added to their systems.

Selecting facilities

MCI's Gallagher said that one of the capabilities he foresees being offered to users through software-defined networks is the ability to select the kind of transmission facilities needed. "If you have a high-speed requirement, maybe 56K bit/sec, you could request a terrestrial digital facility to complete the call, and you would be ensured that both ends of the facility are conditioned to operate at that speed."

Massey pointed out, however, that applications that require higher speed transmission and leased lines are typically on-line applications. The machines used to support on-line applications, however, are ill-equipped to deal with the switched environment.

"What we are lacking at this point," Massey said, "is the intelligence for connectivity at the terminal and mainframe end." This intelligence includes the ability of machines at both ends of a link to establish connections when required and to know when to disconnect.

But it is not too early to start requesting that this be a capability of new equipment, Massey contended. When these software-defined network services become available — Gallagher said MCI will file a tariff sometime next summer; AT&T refused to comment — users will want to be able to act on it promptly, particularly in light of climbing private-line rates.

"I tell data shop managers, 'You keep designing and implementing networks based on private lines, and you are a dinosaur,' " Massey said. "You must start hitting the marketplace and vendors, saying 'I want the capability in my terminal and in my mainframe to make a connection look on-line but on a dial-up basis.' "

CORRECTIONS

An article concerning the inventory control system of Retail Merchandising Service Automation (RMSA) [CW, Aug. 13] should have read that RMSA serves more than 4,500 customers and has upgraded its system from an IBM 360/30 to an IPL Systems, Inc. 4433.

"Cullinet users to convene in Las Vegas" [CW, Sept. 10] incorrectly identified one of the hotels at which Cullinet Software, Inc.'s North American User Week will be held Sept. 30-Oct.4. The meeting will be held at the MGM Grand Hotel and at Caesars Palace in Las Vegas.

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IBM announces high-end additions to 3880 controllers

By Tom Henkel
CW Staff

RYE BROOK, N.Y. — Three weeks after slashing prices on low-end models of its 3880 disk controllers, IBM last week unveiled two high-end units: Models 21 and 23. The controllers feature more cache memory, incorporate 256K-bit memory chips and are field-upgradable from some earlier 3880 models.

Highlights of the announcement include:

■ The 3880 Model 23, which was designed for use in conjunction with IBM 3380 disk drives, can attach to 3080 series; 4381, 4341, 30 series; or 3042 Model 2 CPUs via 3M byte/sec streaming channels. The units offer either 8M, 16M or 32M bytes of cache memory and support IBM's MVS/XA, MVS/370 and VM/SP High Performance Option operating environments. The units can be connected to the host processor through two, four or eight channels.

■ The 3880 Model 21, designed for use with IBM's smaller 3350 disk drives, performs data paging and data swapping functions. Like the Model 23, the Model 21 offers users either 8M, 16M or 32M bytes of cache memory. The unit also contains two storage directors and can attach to either a 1.5M-, 2M- or 3M byte/sec channel. It, too, uses IBM's 256K-bit memory chips.

IBM said both the Model 23 and the Model 21 were designed to keep track of high-activity data and automatically store it in cache memory.

Both the Model 23 and 21 offer a concurrent operations feature that IBM claimed can increase system performance. Based on IBM tests, an 8M-byte Model 23 controller can operate roughly 20% faster than an older Model 13 with the same cache memory. Likewise, IBM said, a Model 21 controller offers performance roughly equivalent to three 3380 Model 11 controllers.

One, two or three strings of 3380 disk drives can be attached to the Model 23, which was designed to handle application data. When one 3880 Model 23 is used, each 3380 string must be attached to both cache storage directors in the unit. When more than one 3880 Model 23 is used, a redundancy feature allows use of alternate paths to access data stored on 3380 disk drives. This feature allows users to continue accessing information, even if one of the 3880s fails, according to IBM.

The Model 23 will be available in the fourth quarter and costs $143,750 for the 8M-byte model. The 16M-byte version costs $183,750, and the 32M-byte version costs $263,750. Monthly rental prices for the units are $7,765, $9,790 and $13,840, respectively. The required Two-Channel Switch-Pair feature for the Model 23 costs $6,225 and rents for $365/mo.

Field upgrades for the Model 23 will be available in the first quarter of 1985. Only users of 3880 Model 3, 13 or 21 controllers with serial numbers between 20200 and 29999, 30200 and 39999, and 40200 and 49999 can purchase conversion packages. All parts removed from installed 3880 controllers become IBM's property, the company said.

In all, 12 conversion packages are available. They range in price from $2,745 for a conversion from an 8M-byte 3880 Model 21 to an 8M-byte Model 23, to $203,480 for a conversion of a 3380 Model 3 to a 32M-byte Model 23, IBM said.

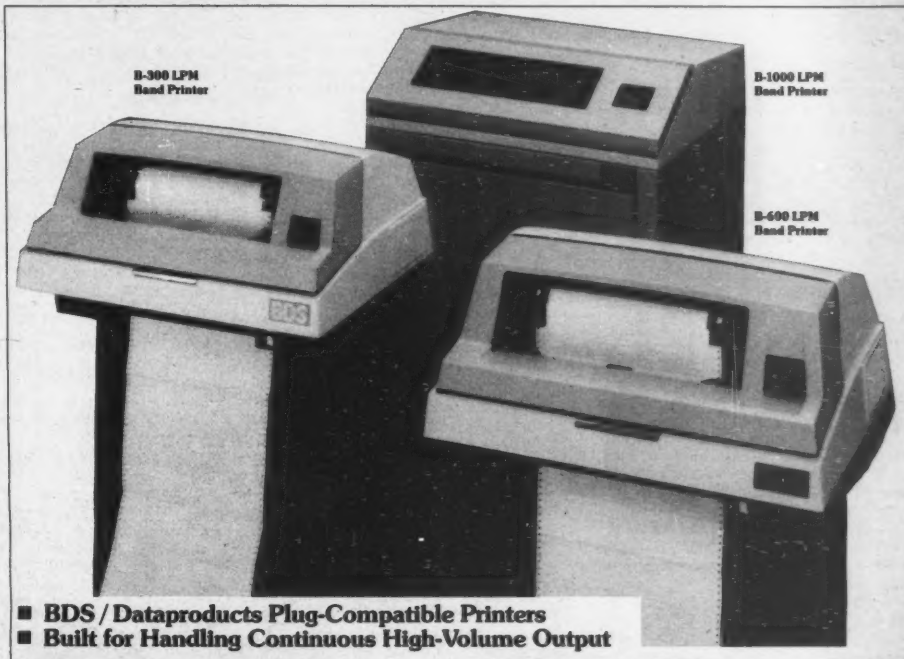
In addition, Model 23 users can upgrade to larger memory configurations. For example, to expand an 8M-byte Model 23 controller to a 16M-byte configuration costs $55,000. Upgrading a 16M-byte Model 23 to 32M bytes costs $80,000, and upgrading a 16M-byte Model 23 to 32M bytes costs $135,000, IBM said.

The 3880 Model 21 can be used on the same series of mainframes as the Model 23, but was designed for data paging and data swapping functions. The unit can support the slower data transfer rates used on some older IBM mainframes. Users have the choice of using the Model 21 to transfer data at 1.5M, 2M or 3M byte/sec. However, the Data Streaming Feature is required to operate the Model 21 at 3M byte/sec on the 30 series or on 3042 Model 2 CPUs.

Available in the fourth quarter, the 8M-byte version of the Model 21 costs $143,750. The 16M-byte model costs $183,750, and the 32M-byte model costs $263,750. The units cost $7,765, $9,790 and $13,840, respectively, on a monthly rental plan. Like the Model 23, the Model 21 configurations require use of the $6,225 Two-Channel Switch-Pair feature.

Users of 3380 Model 1 (with the same serial numbers mentioned above) or Model 11 controllers can convert to the Model 21 beginning in the first quarter of 1985. Conversion prices range from $80,000, for converting an 8M-byte 3880 Model 11 controller to an 8M-byte Model 21 configuration, to $203,000, for converting a 3880 Model 1 controller to a 32M-byte Model 21. Memory upgrades range from $55,000 for upgrading an 8M-byte Model 21 to a 16M-byte model, to $135,000 for upgrading an 8M-byte Model 21 to a 32M-byte configuration.

IBM announced the controllers through its Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.



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Mixed motives for authors of public domain software

Fame, ego, pleasure and generosity. In the words of David Burstein, past president of the New York Amateur Computer Club, those are the motives that prompt software authors to give freely to the public the fruits of their programming labors.

"Any one of those could be the reason an author submits a program to the public domain," according to Burstein. "It depends on who the person is and what he hopes to accomplish.

"Usually, the authors provide documentation with the programs, and they sign their names to it. Others wish to remain anonymous, but some people are very proud of the things they have written and contributed."

Frustration

According to Douglas Chamberlin, coordinator for the Boston Computer Society's IBM Personal Computer Users Group Software Exchange Library, frustration may be an even more important factor.

"It often starts because you are frustrated with the machine; there is something you want it to do that it just cannot. So you get to the point where you write a program to solve that problem," he said. "Once someone has done that, he is usually willing to give it away because the program is not so sophisticated that it could be sold commercially."

Chamberlin added that "there is also a strong undercurrent of sharing and helping that is a force in public domain software. You do not want to keep programs all to yourself because they can be very valuable and useful to others."

And, Chamberlin said, it is no longer just the hard-core computer person or the experienced programmer who gives software to fellow users.

"The hard-core types were enthusiastic about the machines, and they wanted to foster that enthusiasm in others. That was the spirit behind the earlier public domain offerings. We still get those types, but we are also seeing authors who are new to the scene," he said.

"They are not professional programmers, but as they learn to use their computers, they come up with solutions to problems. They submit programs that are more applications-oriented, such as a checkbook balancing program. The programs are not sophisticated, but they are still useful."

Software free for the asking, or for a nominal 'donation'

Within the genus of public domain software there has recently evolved a new species known as "freeware" or user-supported software.

According to Hazel Petersen, a member of the Santa Clara, Calif.-based IBM Personal Computer Software Interest Group (PCsig), the authors of user-supported programs allow users to make copies and share them with others. The authors ask that satisfied users send donations ranging from $3 to $75 for the programs.

PCsig's catalog of public domain software lists about 30 such freeware programs, ranging in function from Chasm, the Cheap Assembler, to PC-Talk III, a communications program for the IBM Personal Computer.

No big initial investment

Douglas Chamberlin, coordinator of the Boston Computer Society's IBM Users Group Software Exchange Library, said the user-supported concept offers authors an opportunity to break into the software business without making a big initial investment.

"The author of a user-supported package has something that he does not want to give away for free, but he does not want to promote it as a regular commercial product that has to be advertised and stocked on dealers' shelves," according to Chamberlin. "So the author lets users try the package, and if they decide it is of value to them, then they send him some money voluntarily."

Freeware is distributed in the same manner as public domain software — through users groups, computer clubs and remote bulletin board systems. Chamberlin said the author of one program, the PC File file management package, has earned in excess of $100,000 through user-submitted contributions. The IBM Users Group Software Exchange Library currently offers about 10 such programs.

"I think there is a pretty even split between the people who contribute and those who do not," Chamberlin said. "A lot of people just do not bother for a variety of reasons — probably the same reasons that people copy commercial programs illegally. Part of it depends on how good the program is. But there is a healthy chunk of people out there who are willing to pay for a good quality program."

SOFTWARE from page 1

such as the BCS that offer extensive libraries of public domain software and the growth in the number of remote bulletin board systems (RBBS) that give users access to those libraries. But the most important factor may be the growing population of people for whom the computer has become a way of life at home and in the workplace.

"In the past, almost all the public domain packages were used by hobbyists or by people who were pretty technically inclined. But the advent of the [IBM Personal Computer] and the compatibles generated a lot of interest among people who were not programmers and who did not use their machines as often.

"The popularity of public domain software is increasing as this segment grows," Chamberlin said. "Just in the last couple of years there has been a whole new crew of people who have been introduced to computers. They are young and eager and ready to dive right into the software that is available."

A programmer by profession, Chamberlin maintains the IBM Users Group Software Exchange Library and distributes public domain packages from that collection to microcomputer users who pay $6 per double-sided diskette to handle copying and mailing costs. Most of the packages are also available at no cost to users through the BCS's RBBS. The library currently consists of 30 such diskettes, each containing about 12 programs organized around a certain theme.

For example, a diskette may contain a collection of games, utilities or statistical, educational or simple data management programs. Some of the programs are designed to help people better utilize their computers and popular commercial packages. Many of the programs also come with documentation on the diskette that can be transmitted to a user's printer. Chamberlin said that some authors of public domain software even update and enhance their programs on occasion.

Similar to the BCS's IBM Users Group library are the IBM PC Blue and Digital Research, Inc. CP/M public domain software collections jointly offered by the New York and New Jersey Amateur Computer Clubs. According to David Burstein, director of business systems for Systems & Solutions, Inc. and past president of the N.Y. club, the PC Blue library contains 72 diskettes for IBM Personal Computers, and the CP/M library has more than 200 diskettes targeted at CP/M-based micros. The diskettes contain up to 30 programs and can be ordered by mail at $6 per diskette or downloaded via the clubs' joint RBBS.

"The concept started eight or 10 years ago when people began to be fascinated by micros, and there was very little commercial software available for them," Burstein explained. "People in those days wrote all their own programs, and they began to exchange those that were particularly useful. Many of the earlier programs were written to supplement CP/M, which was the basis for a number of popular systems, but which lacked a lot of features that users needed. The hobbyist groups began to collect and edit the programs, and they made them available to other users."

As did most people interviewed by *Computerworld*, Burstein said some public domain packages offer users a low-cost alternative to the commercial software available today.

"Some packages are very good, even better than commercial packages. For example, Modem 7 is a public domain communications package that many people use. For nine [people] out of 10, Modem 7 is just as good as commercial packages that cost $150. There is also a data base management system that is sufficient for most users' needs and an asynchronous communications package that at least two banks in New York are using for their micro-mainframe link," Burstein said.

"I advise people to start out using a public domain package, and if they need more, then go out and look for a commercial product," Chamberlin said. "That approach has two advantages. One is that it saves them money. The public domain package may be adequate for your needs, and you may be able to get along without spending any money. The other advantage is that experience with the public domain package will help users to understand what they really need in a commercial program. They will know the questions to ask and will be able to recognize a superior product."

But both Chamberlin and Burstein cautioned users that some public domain packages are spiced with bugs and may be difficult for an unsophisticated user to operate. And, they warned, if you are looking for product support and instruction in the use of a program, it would be wiser to spend the money for a commercial package. While users groups generally attempt to debug the programs they offer, they cannot guarantee the quality of the programs, nor can they aid floundering users.

Some recently founded organizations have tried to provide more in the way of advice and support in the use of public domain software packages. They are companies that put together their own collections of public domain programs and make them available — often for a small operating profit — to a wider audience outside the confines of traditional users groups.

One such organization is the Santa Clara, Calif.-based PC Software Interest Group (PCsig), which grew out of its employees' participation in a local computer club. PCsig's three employees coordinate the dissemination of public domain packages from a diverse library of more than 220 diskettes.

"We believed many people in parts of the country without a strong computer club would be interested in acquiring this software," said PCsig member Hazel Petersen. "We make every effort to provide support. Unfortunately, we cannot guarantee that all programs will run smoothly. Most people do not raise a stink about that."

Direct inquiries to...

The following organizations can answer queries about their own public domain program libraries and may be able to provide additional information about other software sources.

- Software Exchange Coordinator
  IBM Users Group
  c/o Boston Computer Society
  1 Center Plaza
  Boston, Mass. 02108.
- New York Amateur Computer Club
  P.O. Box 106
  New York, N.Y. 10008.
- PC Software Interest Group
  Suite 130, 1556 Halford Ave.
  Santa Clara, Calif. 95051.
- Diskette Librarian
  New York Personal Computer, Inc.
  Suite 640, 80 Wall St.
  New York, N.Y. 10005.

In harm's way, DP disaster plans pass storm's test

By Maura McEnaney
CW Staff

WILMINGTON, N.C.— When it was all over, and Hurricane Diana had passed, John Anderson was a happy man. As director of information systems at a university here, within striking distance of the season's most powerful and menacing hurricane to date, Anderson learned what it meant to be prepared.

When the computer department at the Wilmington campus of the University of North Carolina was notified of the approaching storm, Anderson and others in the department took quick action. They brought down their computer system, which was comprised of two Digital Equipment Corp. VAX-11/780 superminicomputers, one PDP-11 minicomputer and three terminal cluster areas and several microcomputers. The machines were covered with plastic and taped shut.

"We just prepared for it," Anderson said a week after the storm. "We covered our equipment, we covered the windows, and we hugged the ground."

The full force of Hurricane Diana never reached the university, which is located about five miles from where the eye of the storm passed. But even when weather forecasts said the storm would concentrate in the southern coastal areas of North Carolina, Anderson said, he was not going to take any chances. "It took us too long to get our computer system," he said. "I wasn't going to lose it."

Throughout other areas of the North Carolina coast, users of large computer systems were equally prepared, hoping to avoid data loss in case of a storm disaster. Fortunately for all those contacted by *Computerworld*, the force of the hurricane tapered off before any damage was done.

Continuation of operation plan

At General Electric Co.'s Nuclear Energy and Aircraft Engine Business Groups, also in Wilmington, Ron Church and Tom Hayden implemented the company's continuation of operation plan.

According to Church, manager of manufacturing systems operation, when the storm approached, the company updated its data base and cleaned up production. The manufacturing information system was put on backup tape, a daily routine even in good weather. Although the company does have a backup storage facility about five miles away from the plant, data remained on site, he said.

General Electric has about 10 DEC minicomputers and a Honeywell, Inc. DPS/8 mainframe.

At the company's Aircraft Engine Business Group, "We implemented our disaster recovery plan," said Hayden, manager of information systems.

To help save the system — made up of four Prime Computer, Inc. machines, including a 9950, 850 and two 550-IIs; two Perkin-Elmer Corp. 3242s; and two DEC PDP-11/44s — "We did full saves of the system and got the data base in the latest state before we took the power off," he said. "We covered it with plastic and left." Like his colleague, Hayden opted to keep backup data on site.

For some large computer users, disaster recovery programs meant little since mainframe systems were well out of danger, hundreds of miles away. At Pfizer, Inc.'s Chemical Division in Southport, N.C., John Vaught, data processing manager, said his department was mainly concerned with the interruption of telephone service, used to communicate with Pfizer's IBM 4341 mainframe located in Groton, Conn.

"We have two lines, a main leased line and a dial-up backup line," to communicate with the mainframe in Connecticut. "We logged off the mainframe, secured the machinery locally, and everything was set."

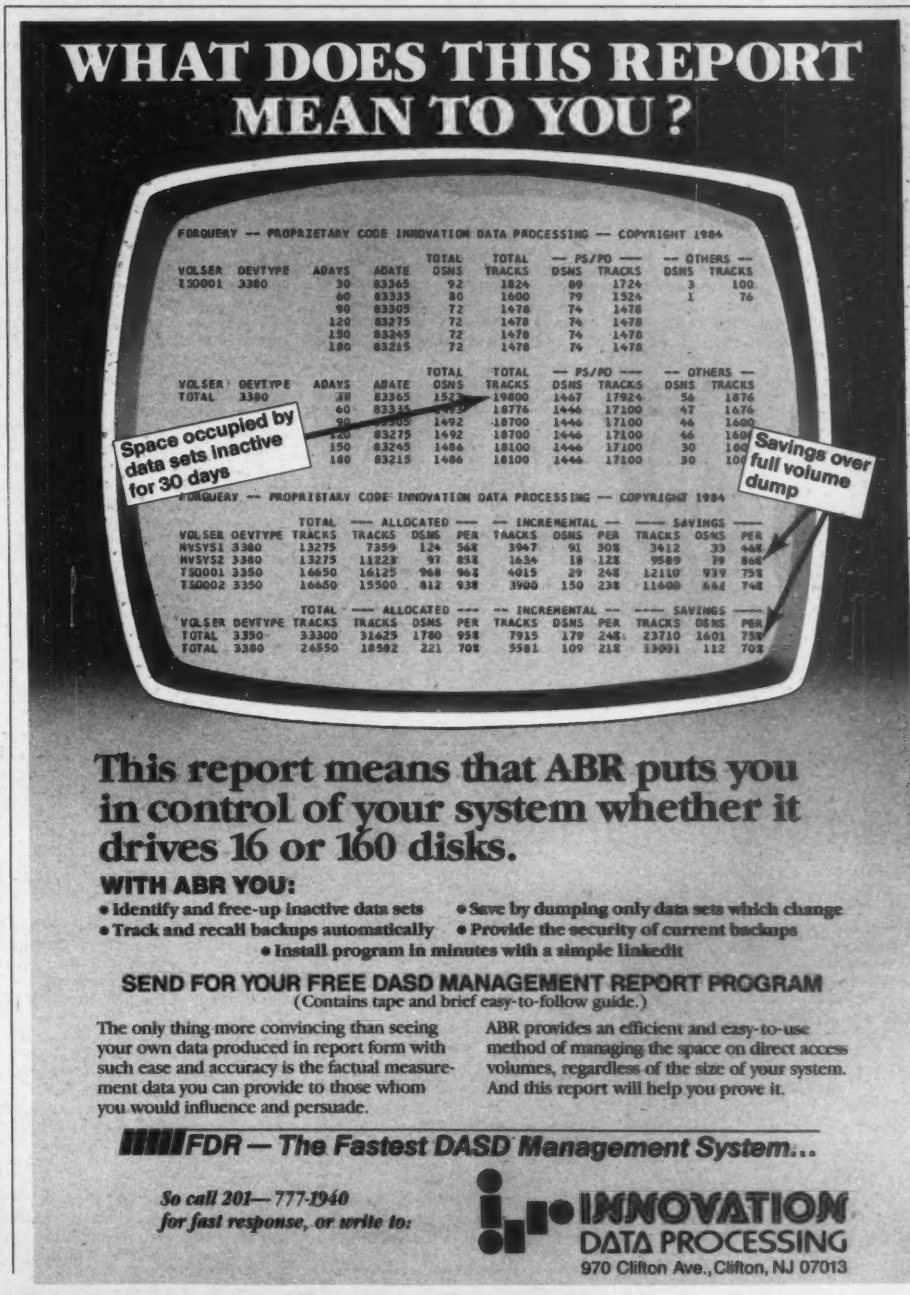
When the worst of the storm was over, communications had been interrupted for only a day. "We came back, uncovered the equipment, called Groton to reestablish communications, and we were back in business," he said.

Glass firm's preparation

Although the eye of the storm was about 12 miles south of the Corning Glass Works' Telecommunciations Division in Wilmington, that building was hit with winds carrying speeds of between 70 and 100 miles per hour, and the area was soaked with a foot and a half of rain. Like other companies in the area, when the storm threat grew, "We implemented our hurricane preparation plan," according to Michael Steenberge, manager of computer services.

Corning took down its two DEC VAX-11/780s, one VAX-11/750 and about 45 PDP-11/44s used for process control in the manufacturing systems; backup files were moved off site about 20 miles from the plant; and arrangements were made with a vendor to provide system engineers and extra parts in case of an actual disaster.

But, as at Pfizer, the only technical problem that occurred was the loss of telephone communications. "We came back into work and [on] Friday established communications with Corning, N.Y.," according to Steenberge.



DG from page 1

screen offers 640- by 256-pixel resolution, generates shades of gray and handles bit-mapped graphics applications, the company said. When not in use, the screen folds down, and the entire computer measures 14 in. by 12 in. by 3 in.

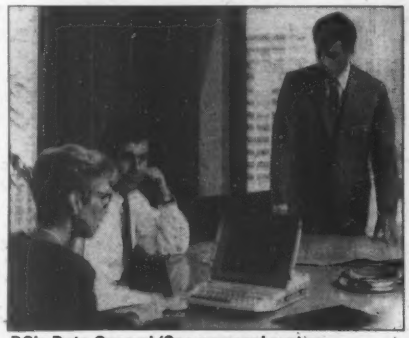
The Data General/One features 128K bytes of random-access memory (expandable to 512K bytes); a 79-key keyboard; a built-in, 737K-byte (formatted) 3½-in. floppy disk drive; two asynchronous ports; an ac adapter; and Microsoft Corp.'s MS-DOS operating system. Starting price is $2,895.

In addition to MS-DOS, the Data General/One runs Digital Research, Inc.'s CP/M 86 and Venturcom, Inc.'s Venix (a microcomputer version of AT&T's Unix). Nearly 70 applications programs are available in 3½-in. formats, including 20 popular business packages, the company said.

Some of the programs currently offered are Lotus Development Corp.'s 1-2-3 and Symphony; Ashton-Tate's Dbase II; Micropro International Corp.'s Wordstar and Wordstar Professional; Microsoft's Multiplan, Word and GW Basic; Digital Research's Level II Cobol, C, PL/I and Pascal/MT+; and Software Arts, Inc.'s TK!Solver.

DG also introduced the CEO Connection, a $295 package said to give Data General/One users access to the vendor's Comprehensive Electronic Office (CEO) system.

The CEO Connection package reportedly permits user-transparent file transfer and document conversion between DG's CEO software and selected MS-DOS word processing documents and spreadsheet packages running on the portable. CEO Connection also enables the microcomputer to act as a DG terminal running CEO software and other Eclipse MV family applications. AOS/VS CEO Connnections software running on the Eclipse machines is priced at $5,000.



DG's Data General/One personal system.

Software packages in read-only memory offer text editing functions and emulation of teletypewriter and DG's Dasher D2 terminals.

An optional $899 stand-alone desktop 5¼-in. floppy disk drive permits the new portable to run off-the-shelf IBM Personal Computer software, the company said. In addition, packages on 5¼-in. diskettes that are not copy protected reportedly can be downloaded to the Data General/One.

The Data General/One is based on the 80C88 chip, a Cmos version of Intel Corp.'s 8088 microprocessor. Employing 3½-in. drives and extensive use of Cmos technology, the new portable's design minimizes power consumption, according to DG. An optional $79 rechargeable battery pack is said to allow users to work at remote locations for eight to 10 hours. A battery recharger is priced at $99.

Add-on 128K-byte memory cards carry a $599 price tag. Other options include a second internal 3½-in. floppy disk drive that costs $599, a $299 300 bit/sec internal modem and a 4-lb portable near-letter-quality printer priced at $525 with battery.

DG also plans to offer an IBM Personal Computer-compatible expansion chassis that accepts up to five full-size expansion cards and can be configured to include floppy or hard disk drives. Price information was unavailable at press time.

In addition, DG introduced a runtime version of its interactive Cobol language that runs on MS-DOS. MS-DOS interactive Cobol Runtime lets a broad range of Interactive Cobol applications run on the Data General/One, the vendor's Desktop Generation Models 10 and 10SP and other machines running MS-DOS and IBM's PC-DOS. Again, cost information was unavailable at press time.

DG is located at 4400 Computer Drive, Westboro, Mass. 01580.

SPERRY from page 1

for networks."

Usernet connects up to 63 workstations over distances of up to 4,000 feet, according to Sperry. The baseband system operates at 1M bit/sec over twisted-pair cable with a carrier sense multiple access/collision avoidance (CSMA/CA) design, Walther said. The system reportedly can be configured and installed by users, avoiding expensive rewiring.

Sperry said that other Usernet features include password protection, four levels of security, full file and data sharing facilities and synchronization of user requests.

The network uses a Sperry Personal Computer as a Data/Print Server for monitoring workstations and acting as a central storage device, the company said. Each network requires one Data/Print Server, which supports up to three printing devices and acts as a local workstation when not handling network functions, according to Sperry.

Two Data/Print Server configurations are available:

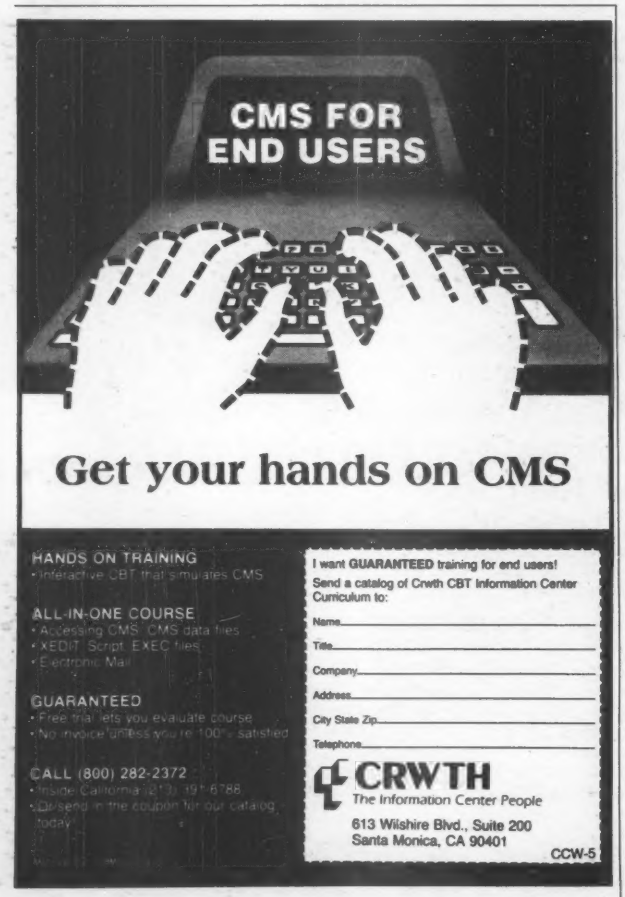
- The DS100 is based on the Sperry Model 40 Personal Computer and includes a monochrome monitor, 256K bytes of random-access memory (RAM), one 360K-byte floppy disk drive, one 10M-byte hard disk drive, an RS-232 serial port, network interface hardware, MS-DOS 2.11 and networking shell software and the Usernet network operating software. Its cost is $6,390.
- Sperry's DS120 Data/Print Server is built around the Model 20 Personal Computer and features a monochrome monitor, 512K bytes of RAM, two floppy disk drives, the model 8441 30M-byte hard disk drive, an RS-232 serial port, network interface hardware, MS-DOS 2.11 and Usernet operating software. Its price is $9,890. A second 30M-byte drive can be added.

Network interface boards for additional personal computers cost $525 each. Active junction boxes, required to expand the net beyond 1,000 feet, are priced at $170 each.

Sperry plans to introduce a family of bridge and gateway communications products that will link Usernet to other nets and communications environments, according to Walther, but no details on these products were given.

Usernet will ship in October.

More information is available from Sperry Information Systems Group, P.O. Box 500, Blue Bell, Pa. 19424.



Pentagon plans automated center for military software production

WASHINGTON, D.C. — The Department of Defense recently disclosed plans for the development a new research center.

Called the Software Engineering Institute (SEI), the center is expected to be a state-of-the-art automated factory for the production of software of particular use to the military.

The center's objective is to reduce the labor intensiveness of developing military applications software to meet a growing demand for sophisticated software in an efficient and affordable manner, a Pentagon statement said.

Software 'showcase'

It also said the SEI will become a "showcase environment" for modern software engineering techniques and will promote use of the techniques throughout the military computer community.

According to the statement, the Defense Department maintained it wants to support the trend toward automated software development, including reusable software components, sophisticated workstations and physically dispersed development using advanced communications networks.

Major technical projects will include development of interface specifications and criteria for the evaluation and validation of environments, the statement said.

A contract for the Software Engineering Institute will be awarded in early November. Proposed funding will be $8 million for the first year of the project and increasing up to $20 million per year by the project's fourth year.

Users will benefit from competition as service market doubles by 1990

By Peter Bartolik
CW Staff

NEW YORK — The market for service and repair of electronic products is expected to more than double by 1990, providing equipment users with a greater choice of service providers and greater bargaining power over costs, a recent report indicated.

The report, commissioned by the Association of Field Service Managers (AFSM) and prepared by the management consulting division of Arthur Andersen & Co., also predicted that end users in 1990 will play an increasing role in selecting service for minicomputers, office automation systems and systems peripherals.

Thomas M. Ross, executive director of AFSM, said the report was intended to supply both providers and users of services with market information for long-term planning.

According to Jeffrey Miller, a partner in the management information consulting division of Arthur Andersen's New York office, the report showed that dramatic growth

'Clearly, the winner in the upcoming fray will be the service customer.'
— Jeffrey Miller, Arthur Andersen & Co.

and structural changes in the service industry over the next few years will result in increased expenditures on office automation services, intensifying third-party competition, and an expansion of alternative delivery channels.

"The winner in the upcoming competitive fray will be the service customer," Miller said. "For the first time, the service customer will have a choice of service providers for an office network or an individual piece of equipment. Service firms will aggressively compete for major service contracts, offering price concessions and service terms tailored to a customer's unique requirements."

The study was conducted using the so-called Delphi technique; panels of service executives, business planners, technical executives and service customers were polled on strategic issues, and consensus predictions were developed. Customer panelists were primarily DP vice-presidents in companies with annual revenues in excess of $1 billion.

The report forecast that service industry revenues will grow at a 14% compound annual rate over the next few years and will more than double to $46 billion by 1990.

Captive service organizations will play an integral role in the growth of manufacturing companies and could contribute as much as 30% to total corporate revenues of leading services, the report said. At the same time, alternative service delivery and customer self-service options will gain an increasing market share.

The competition will lead providers to try to differentiate their services offerings from those of other firms and will lead to a greater emphasis on servicing systems that include products from different manufacturers. IBM and AT&T will offer service for competitive products that are networked with their own, and companies such as Control Data Corp. and Honeywell, Inc. will offer full-line service over a variety of competitive products, the report predicted.

While the report indicated those dynamics will give customers greater bargaining power over pricing and contract terms, the customer panelists in particular believed that a significant shift in end-user involvement in service selection will occur.

The greatest influence will be in office automation, where 43% of customer panelists expect end users to make the decisions and where service revenues are expected to outperform both mainframe and minicomputer by 1990. The report is available for $100 from AFSM at Suite B, 7237 Presidential Court, Fort Myers, Fla. 33907.

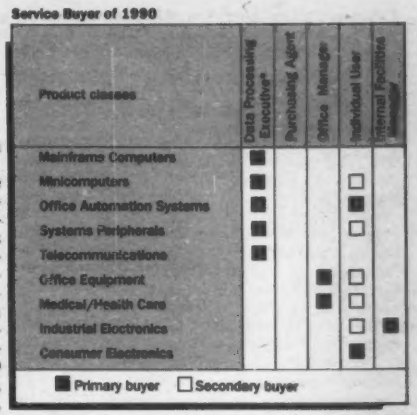


CHART COURTESY OF ARTHUR ANDERSEN AND SFSM

CICS for the COBOL Programmer Part 1: An Introductory Course

If you work with CICS...as a manager, a trainer, or a COBOL programmer...you should get a copy of *CICS for the COBOL Programmer, Part 1: An Introductory Course.*

Why? Because this book zeroes in on the basics of CICS, leaving aside the features you won't use right away.

So beginners can use it to learn CICS without getting bogged down in a lot of detail. Experienced CICS programmers can use it to gain a better understanding of CICS that will help them produce more efficient programs. And everyone in your shop can use it as a reference manual to save time and coding errors.

Here's just some of what you'll find in this book:

- the meanings of the critical terms and concepts that apply to CICS
- how to use basic mapping support (BMS) macros to create a mapset...the special assembler program that defines screen formats for a CICS program
- 4 CICS terminal-handling commands that let COBOL programs communicate with 3270 terminals
- 5 CICS file-handling commands that let COBOL programs access VSAM key-sequenced (or ISAM) files
- 3 CICS program-control commands that let you transfer control from one COBOL program to another
- pseudo-conversational programming ...what it is, why you have to use it, and how it complicates the logic in a COBOL program
- why program efficiency is vital under CICS...and how to write programs that make the best use of your computer's resources
- how to design a *structured* CICS program
- how to test CICS programs using top-down testing
- how to debug CICS abends using either the Execution Diagnostics Facility (EDF) or a storage dump

4 reasons why this book works

1. To learn CICS programming, you have to grasp several complex concepts all at the same time. This book works because the author, Doug Lowe, carefully explains how each of these concepts relates to the whole.

In contrast, most courses present each CICS element separately, without showing relationships. No wonder so many people are baffled by CICS!

2. Doug spent a lot of time choosing a usable—and teachable—subset of CICS for this book. As a result, you won't learn *every* CICS feature...just the most useful ones. And you'll build a solid foundation for learning the additional CICS elements ...like alternate indexing, queue management, and terminal paging...that will be covered in *Part 2: An Advanced Course* (available next year).

3. Doug gives you plenty of coding models in this book...for CICS elements, common COBOL routines, and BMS map definitions. I'm convinced these examples, more than any other factor, will help you understand how the new elements and routines work. And I know your productivity will go way up if you use these models when you write your own CICS programs.

4. Although effective program design is critical to the success of any programmer, I've yet to see a CICS course that deals adequately with the subject. In fact, most of them don't say anything about design at all.

In contrast, this book stresses effective, structured design. So you'll learn to break programs down into logical units that are easier to code, test, debug, and maintain.

Why wait? Get a copy TODAY

If you want to know more about how to develop CICS programs...or you need a practical, easy-to-use reference with plenty of examples...get *CICS for the COBOL Programmer, Part 1* TODAY. I think you'll be surprised at how much knowledge and reference material you can get for $25!

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Panel stresses need for corporate telecom policies

CW AT TELECOMMUNICATIONS ASSOCIATION

By John Dix
CW Staff

SAN DIEGO — Once treated simply as another utility, the growing importance of telecommunications is forcing companies that have not done so already to create corporate policies similar to those used to govern data processing.

That was the consensus of managers interviewed here last week at the annual meeting of the Telecommunications Association.

The idea of establishing corporate telecommunications policies is relatively new. Conference attendees said the need arose within the last five years as the result of increasing telecommunications service costs, new service options and the merging of communications with data processing.

"You can no longer treat communications like a utility," noted Ed Walsh, director of telecommunications for the southern district of California's rapid transit system.

The baseline aim of policies meant to guide a company's communications efforts is to establish a strategic plan that will provide for growth while minimizing expenses, users concurred. Beyond that, the reasons for creating these policies varied by company, as did the manner in which the companies went about trying to meet those goals.

Wells Fargo Bank in San Francisco created its corporate communications policy two years ago. Fred Phares, vice-president and manager of voice services for the bank, said the policy was established in answer to the merging of communications and data processing. Stated simply, the company policy now used for both disciplines calls for increasing capacity while providing for flexibility and reducing costs where possible.

Other companies' policies are more rigid policies, saying that "operations and procedural manuals tend to tie your hands." The policies used within his organization were established when telecommunications was pulled out from under general services and made into a separate department six years ago. And while more implied than stated, he said, the charter of his group is to minimize expenses through capital expenditures.

Still other companies seek to solve the problems of managing the corporate communications asset by merging that department with others and giving the resultant group a blanket policy.

Imperial Group, a $6 billion London-based conglomerate that owns Howard Johnsons Co., has done just that.

Ron Bell, head of telecommunications development for Imperial, said that the company's written policy covers telecommunications and data and text processing. Because of the company's breadth, by necessity, the policy is constantly evolving.

Some of the more fundamental things dictated by this policy include the use of leased lines within the corporation's network. Further reaching policy elements include the gradual migration to digital transmission facilities. In Imperial's case, the integration of telecommunications and data processing was relatively painless because the two departments formerly coexisted under a broader management services group.

The impetus for integration came primarily from the merging of communications and data processing,

See POLICY page 11

extravagant. Sunkist Growers, Inc. in Sherman Oaks, Calif., has a written policy that outlines the duties of many groups, including two within communications.

One group, called the Electronic Communications and Office Automation Coordination Committee, consists of the telephone, data processing, data communications, office services and corporate analysis mangers and an industrial engineer.

This group, according to telecommunications manager L.E. Faulken, meets once a month to create strategies, form guidelines and discuss acquisitions in any of the related areas.

Faulken admits that this system, formed three years ago, is not perfect. "Committees can get too rigid," he said, "but it does give us all the opportunity to keep up on technology." He also noted that the procedure is under constant review.

Walsh of California's rapid transit system echoed the sentiment about

> *'The baseline aim of telecommunications policies is to establish a strategic plan that will provide for growth while minimizing expenses.'*
> — a consensus of users at TCA.

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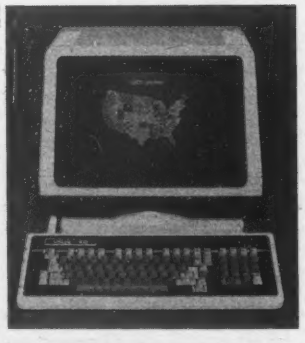
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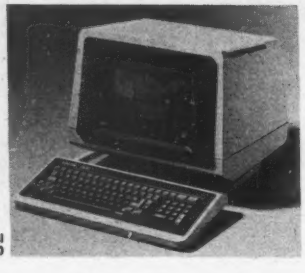
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Users have mixed reactions to IBM Cabling System

CW AT TELECOMMUNICATIONS ASSOCIATION

By John Dix
CW Staff

SAN DIEGO — The jury is still out on the IBM Cabling System, gauging by the mixed feelings expressed here last week by attendees at the Telecommunications Association meeting.

Users queried in an informal survey reported varying amounts of enthusiasm for the building wiring scheme that IBM announced last May [CW, May 14]. While some users said they could justify the Cabling System on the flexibility it provides for equipment installation and relocation, others said they would not be interested in it until IBM provides the promised components needed to make the system into a local network.

Even with IBM's stated intent that it would not provide these networking products for another two years, some users are seriously considering the wiring system.

John F. Duffy, assistant director of telecommunications and office technologies at ICI Americas, Inc., a $1.5 billion chemical company based in Wilmington, Del., said his company will use the Cabling System in some of its new buildings because it "doesn't [impose limits]."

The wire is inexpensive, Duffy said; the major expense lies with the installation. But when you are putting up a new building, that cost is less significant, he added.

When in place, the Cabling System will provide a single wiring harness for both voice and data cables and an outlet for each in all offices of a building, he explained. Today, wires used in both these applications are strung separately, often along different routes.

The initial benefit of the system — before local network components are added — will be the ease with which terminal and other peripheral equipment can be installed or relocated, Duffy said. This capability will increase flexibility and help alleviate delays associated with waiting for a building operations department to string new wires.

But perhaps more importantly, Duffy noted, use of the Cabling System leaves options open. "You can't run an IBM local net on AT&T twisted pair because it's not shielded," he said. "You could run an AT&T network on an IBM Cabling System because it uses a higher grade wire than the AT&T net needs."

Like ICI Americas, Raychem Corp. in Menlo Park, Calif., is paying close attention to the Cabling System. Part of that interest stems from the fact that many other local net manufacturers have announced plans to make products that will be compatible with the wiring scheme, noted Jim Floyd, network services manager at the company.

Floyd said that Raychem "hasn't found an application that seems a natural fit for the Cabling System, but we're open to it; it sounds reasonable." One application where the system might make a lot of sense, Floyd added, is where support is needed for IBM System/36-type devices that use twinaxial cable.

Other users are wary of making a commitment to one vendor for something like the Cabling System. Bernard Kaye, manager of teleprocessing at Beckman Instruments in Fullerton, Calif., said that his company's philosophy aims at not locking itself in with any one vendor.

Still others said they could not see installing the system until the local network components were released.

"Anybody that would buy into that system based on capabilities promised in two years would be crazy," quipped a user who did not want his name mentioned. And, while less adamantly, this sentiment was reflected by another attendee who said that what "everyone is really waiting for is IBM's local network solution."

Another user that wished to remain anonymous concluded that "imaginative users could enhance the Cabling System to support asynchronous as well as synchronous terminals," thus making the system more attractive even without the local net capabilities.

POLICY from page 10

Bell said. And the single most important device behind the merging of DP and communications, in his mind, is the personal computer.

Mid-Continent Computer Services, a San Diego company that provides on-line services to savings and loan associations, has also combined departments to cover them with a corporate policy.

According to data communications manager David R. Beekman, his company formed a data communications department to handle both voice and data. The stated objective of this new group is to optimize the company's network while providing for the best possible service. While the new group integrated voice and data, the department is operated under policies that are independent of those used in data processing.

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01-CW-9-24-4

Host of communications products debut at exhibition

CW AT TELECOM ASSOCIATION

SAN DIEGO — Despite unseasonably hot weather and persistent power outages that nixed air conditioning in the conference hall, communications vendors at last week's Telecommunications Association exhibition unveiled a host of products.

Infotron Systems Corp. unleashed the 990NP, a network processor said to be able to reroute automatically a data path in case of link failures between nodes or because of node congestion. This feature, called Tandem Switching and Alternate Reconfiguration, reportedly maximizes network uptime.

A network of 990NPs, which can be controlled from a single location using the company's ANM-800 advanced network manager, can support asynchronous and synchronous protocols, including bisynchronous emulation and Synchronous Data Link Control passthrough, the company reported. In the future, X.25 links will be supported.

The 990NP can support up to 640 local channels, and the smaller 992NP can support up to 104 channels, the company said.

Prices for the units start, respectively, at $12,600 and $9,800. The company is located at Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

Digital Communications Associates, Inc. (DCA) came to the users conference to display its new network management system (NMS) and a new line of modems.

Designed for use with the DCA Series/300 network processor, the NMS consists of software that can be run on the IBM Personal Computer or Personal Computer XT. Using a Personal Computer outfitted with NMS, a network manager is said to be able to use menus and standard formats to monitor and control the network.

NMS' versatility

A systemwide data base manage. within the software is said to enable the network manager to check and change configuration data, receive network topology information, keep a statistical history of the network and maintain an alarm contact list. Additionally, the system can be used to monitor continuously all nodes on a real-time basis. The NMS will be available in January with prices starting at $9,995.

In conjunction with that announcement, DCA introduced a new modem line called the Series/900. The family includes five devices: the 910, a 1,200 to 2,400 bit/sec, full-duplex synchronous modem that is CCITT V.26-compatible; the 911, a 1,200 to 2,400 bit/sec, full-duplex modem for use in two-wire, dial-up applications that is AT&T 212A compatible; the 920, a 2,400 to 4,800 bit/sec full- or half-duplex synchronous modem for leased-line use; the 930, a full-duplex synchronous device that operates at 4,800, 7,200 or 9,600 bit/sec and has an optional four-channel time division multiplexer; and the 940, a modem with the same capabilities as the 930, but which can also handle 14.4K bit/sec and a six-channel, built-in multiplexer.

The modems range in price from $1,095 for the 910, to $5,395 for the 940. They are available 60 days after receipt of order. DCA is located at 303 Technology Park, Norcross, Ga. 30092.

Regarding service announcements made at the show, GTE Sprint Communications Corp. made a splash with the announcement of Sprint Advanced Wats.

This service is different from AT&T's Wats in that users are charged according to their termination point, not by band of service. GTE claimed this will result in lower bills because there is no spillover effect.

More information is available from GTE Sprint at 1340 Old Bayshore Highway, Burlingame, Calif. 94010.

Will the new

Content Address Method™

make the relational data base obsolete?

Although the relational data base was first conceived in the early 1970's, it has only recently been offered as a practical application. So it seems ironic that this long awaited technology may soon be considered obsolete due to the new Content Address Method.™

Users mail verbal notes over Ethermail at beta test site

By Edward Warner
CW Staff

CARROLTON, Texas — When a manager at Intelligent Information Systems, Inc. (IIS), a software developer here, gets a memo over his company's Xerox Corp. Ethermail electronic mail system, he often gets something to listen to as well: a verbal note from the message's sender.

Spoken messages are being added to the memos, and software documentation is being transmitted over Ethermail at IIS because of a recently announced enhancement provided by Texas Instruments, Inc. as an option for its Professional personal computer.

Called Ethervoice, the enhancement allows the Professional, through an optional Speech Command module, to add voice messages to Ethermail, transmitted on the Xerox Ethernet local-area network. Users speak their messages into the Speech Command's microphone, the message is digitized, recorded and later reproduced on the recipient's Professional by the Speech Command system's loudspeaker.

Ethervoice was beta tested by IIS on its 10 or so Ethernet-linked TI Professionals with Speech Command this spring and introduced at the National Computer Conference in Las Vegas in early July. IIS has yet to decide on the Ethervoice system, but if it does, it will receive it at a discount, provided for its beta-testing services.

IIS is using Ethervoice primarily for adding clarifications and notes to the company's software documentation as the documentation is passed from one workstation to another, which has "eliminated a lot of conversational questions" that would otherwise result in telephone calls or visits to the message's recipient, said IIS systems analyst/designer Tom Kimsey.

"It's increased my efficiency," Kimsey said. "I don't have to go from desk to desk or office to office explaining what this memo says."

In use at IIS since early April, Ethervoice is operated by the Professional's function keys much like a tape recorder, according to a TI spokesman. It offers message recording at two levels of quality, 2,400 and 9,600 bit/sec, and is based on Ethervoice software running on the Ethernet's network server computer.

Ethermail messages, both printed and spoken, are stored on the network server's hard disk storage unit and later retrieved when message recipients log on to their electronic mailboxes.

Kimsey said Ethervoice has not increased the firm's use of Ethermail in general or cut its needs for memo typing, but added that it has promoted clarity in messages and has proven extremely easy to learn.

Learning is aided, he noted, by a "good to excellent" Help feature, actuated by one keystroke, that tells beginners how to operate Ethervoice. The Help feature, he said, is "one of the things that made the installation [of Ethervoice] work well."

The installation of Ethervoice took only about 2½ hours, including 45 minutes for training, Kimsey noted. When Ethervoice was first put in, he said, the company lost a few messages and experienced some problems with poor voice reproduction. The reproduction problems were cured in later releases, and the message loss problem was likely due to problems with Ethernet, not Ethervoice, Kimsey said.

A simpler, more efficient way to identify and retrieve data.

Conventional data retrieval methods force you to accept a number of unproductive trade-offs in place of real efficiency. For example:

Information has to be organized according to a rigid structure to permit access to the information. That means you lose flexibility in developing new applications.

The Content Address Method does not depend on any predetermined structure. It creates its own path to your data, no matter how your information is organized.

With conventional methods, individual records within a file can only be located by unique, pre-established keys. The more specific your information request, the more keys you have to use and the greater your storage overhead becomes.

The Content Address Method has its own unique way of identifying and locating data. So your information request can be as specific as you wish, without driving up overhead to the usual levels.

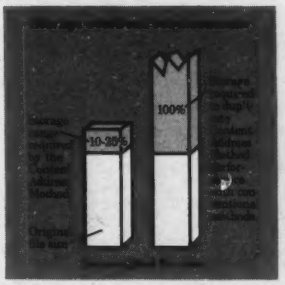
Locating an individual record with conventional methods requires sequential searching through a file, if it is not a keyed field search. The cost in wasted effort and CPU access time can be prohibitive.

The Content Address Method can immediately and directly locate a record, or even a word within a field with equal ease and minimal impact on your direct access storage costs. Required storage for the Content Address Method is usually less than 15% of the file size and almost never more than 25%.

How the Content Address Method works.

The Content Address Method is a technique that establishes its own path to stored information, without altering its present structure, order or location. This means that you can take advantage of this new technology without ever changing your existing organization of data. And because this method ignores the structure of data and depends only on the actual content of a record, there is never any need to reorganize files to fit new applications.

Under the Content Address Method, stored data is analyzed and indexed once, automatically. Each field, with its substrings, is assigned a mathematical value, based on content, to identify the information it contains. Since these record identifiers or "keys" are related numerical values instead of character strings, the storage space required to index your data is almost never more than 25% of the original file size. More often, it's less than 15%.



Conventional access methods require you to devote storage space to indexing record keys. Keying individual fields can use twice as much storage as the file itself. The Content Address Method almost never requires more storage than 25% of the original file size. Most often, required storage is less than 15%.

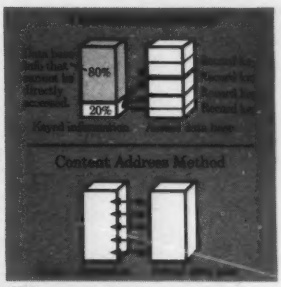
It doesn't fit the usual definitions.

The Content Address Method is not an access method in the usual sense, but it does make it easier to identify and retrieve data. It isn't a data management system, but it offers the same power and advantages. The Content Address Method requires no costly and time-consuming conversion, so you won't have to tie up your data center or risk lengthy backlogs. It simplifies data base administration by eliminating the need to store data according to how it will be retrieved. It cuts search time, no matter how complex the search criteria. In fact, the more detailed the criteria, the faster the search can be completed.

Not for sale at any price.

The Content Address Method is a new technology, not a software product. You can't buy it. But you can use it. The Content Address Method is at the heart of many of the programs developed by On-Line Software International. The Content Address Method frees application programmers using our FREE-STYLE™ software from file design considerations. It gives users of our ExecuTrieve™ query system faster and more efficient access to information. And it offers users of our OMNILINK™ software the ability to download individual fields and records between their IBM PCs and mainframes.

So even though you can't own the technology behind the Content Address Method, you can enjoy the benefits it offers every time you use software from On-Line Software International.



With conventional methods, you can usually afford direct access to only about 20% of your data base. However, the Content Address Method provides direct access to every field and its sub-strings, and does it cost effectively.

A summary of the benefits of the Content Address Method.

- Identifies and locates data based on content, not sequence or key names.
- Ensures that the records you read are only those that contain the information you want.
- Permits flexible application coding.
- Requires less than 25% of the original file size for storage.
- Co-exists easily with existing software.
- Operates with all standard access methods.

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AT&T plans credit corporation to push leasing effort

Plans include lease financing; users encouraged to sell old, buy new

By Peter Bartolik
CW Staff

MORRISTOWN, N.J. — AT&T Information Systems, Inc. will form its own credit corporation, which will compete in lease financing with many of the same companies that it hopes will create a secondary market for used AT&T products.

According to a top executive of AT&T Information Systems, the marketing arm of AT&T Technologies, an alternative, or secondary, market will serve dual functions by establishing resale potential for used equipment while encouraging users to sell their old equipment and purchase new AT&T products.

In an interview at AT&T Information Systems headquarters here, Robert J. Casale, recently appointed to the new position of executive vice-president for financial and strategic planning, discussed the company's secondary market strategy.

Working with third-party dealers and lessors and through the forthcoming AT&T Credit Corp., AT&T Information Systems hopes to expand distribution of new products and create a resale mechanism that will encourage users of old equipment to replace it with new equipment, Casale explained. "What we are most interested in is moving newer products into the marketplace as quickly as we can and as broadly as we can."

The company will focus first on developing the secondary market for used telecommunications products, but longer range plans include also developing a secondary market for computer products, Casale said.

Joseph Russo, division manager of secondary markets for AT&T Information Systems, said the company recognizes that third-party industry participants have invested heavily in leasing new equipment, and that AT&T Information Systems will make specific provisions for leasing arrangements soon.


Casale

Charles Greco, a manager with the leasing planning service at International Data Corp. of Framingham, Mass., noted that AT&T Information Systems is emulating IBM's success with the secondary market and will seek equity partners to fund leasing activities for its yet-to-be-formed credit corporation. "AT&T is trying to do in one year what IBM took 20 years to do," Greco said.

Greco's firm is working with AT&T Information Systems to determine residual values of used equipment, a necessary requirement for writing leases that are based in part on the expected resale value of equipment at the termination of the leases.

Residual values of telecommunications equipment is presently a large unknown, Greco explained, because telecommunications products traditionally have been depreciated over long periods of time, in some cases as much as 30 years, in comparison with five years for computer equipment.

Also working with AT&T Information Systems is CMI Corp., a Bloomfield, Mich.-based computer leasing company said by Greco to be the third largest in the third-party industry. CMI, Casale added, is developing a dealer network for AT&T Information Systems products and is educating AT&T's sales force on providing financing alternatives to users.

Edward Cherney, president of CMI, said in a recent interview that developing a third-party market for telecommunications products will rest partially on developing the same fluid, easy-moving market that IBM equipment has achieved. AT&T Informations Systems, Cherney said, has made a commitment "to ease of maintenance and transferability," which is required to revamp used equipment and transfer it from the seller to the buyer.

Casale said AT&T Information Systems has been working on "orderly development" of a third-party market for more than nine months, since "we decided that if we didn't [develop the secondary market], others would do it for us."

Nevertheless, Casale added, AT&T Information Systems is not conceding the leasing market to the third-party industry. "AT&T has been planning a credit corporation, so we will be utilizing the credit corporation as well as the third-party industry; we will be utilizing our internal resources in the secondary market," he said.

Such a captive credit corporation has at times caused friction between IBM and the third-party industry, which collectively is IBM's largest customer.

But both Cherney and Casale emphasized that the size of the market presents substantial opportunity for both the manufacturer and the independent dealers.

"The fact that AT&T Information Systems is establishing a credit corporation blesses the concept of the whole third-party industry for telecommunications equipment," Cherney said.

AT&T to add Information Systems Network upgrades

New interfaces target office, factory users

By Phil Hirsch
CW Washington Bureau

HOLMDEL, N.J. — Several enhancements will be added in coming months to the Information Systems Network (ISN) recently unveiled by AT&T Information Systems, two company officials said here recently.

Dennis Morgan, head of AT&T Information System's local area development department, and Neil Vasant, ISN product manager, promised a new family of interfaces for office and factory users of personal computer-based workstations. A switched synchronous interface is also in the works, they said.


Vasant

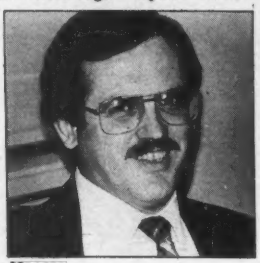
The initial version of ISN, which is now available on a limited basis and will become generally available in December, can serve a maximum of 1,920 end points per switch. But, as Morgan pointed out, larger requirements can be met by using multiple switches and interconnecting them.

When asked how soon this enhancement is likely to become available, he said "six to 18 months," indicating that within this same time frame a factory version of the AT&T local-area network probably will be announced, plus the new family of personal computer terminal interfaces.

Although ISN presently connects at the RS-232C level with virtually all presently marketed personal computers, it does not offer end-to-end error control or multiplexing capability to these users, Vasant explained. These are two of the features that will be provided by the new personal computer interfaces, Morgan added.

Basically, the error control and multiplexing will be provided at the user's terminal by extending an existing, packetized protocol that now terminates at ISN concentrators. The ISN architecture consists of a central switch connected to end-user terminals through intermediate concentrators.

The new interfaces also reportedly will allow attached personal computers to communicate with ISN over twisted-pair access circuits at much higher speeds. "Initially, we'll jump from 19.2K bit/sec, the present maximum rate, to 1M bit/sec," Vasant said. In addition, higher level protocol conversion (up to Level 7 on the Open Systems Interconnection model) will be supported.


Morgan

Both of these improvements are required by the growing use of personal computers and the increasing complexity of their applications, Vasant said. He cited graphics terminals as one illustration. Engineers are using them to retrieve, work on and communicate detailed engineering drawings. Meanwhile, through the use of windowing software, a user can create multiple simultaneous graphics displays on his screen. But for this software to work, the associated terminals have to support common application-level protocols.

The new personal computer interfaces, by allowing higher bit-rate transmission over the twisted pairs connecting personal computer terminals to the ISN concentrator, and by providing higher level protocol conversion, will meet these requirements, Vasant said.

ISN, as it is presently offered, supports only asynchronous terminals directly. But the two officials reported that a switched bisynchronous interface is planned. Beyond agreeing that it has a high priority, neither of them would specify when the new interface will be available.

The ISN's priority is explained partly by AT&T Information Systems' effort to gain a foothold within IBM's customer base. Not only is the new AT&T personal computer compatible with IBM's MS-DOS operating system, but AT&T Information Systems also offers a Premises Lightwave System (PLS) that allows up to 32 IBM 3270s to communicate with their cluster controller over a single, full-duplex fiber-optic cable. The PLS, besides replacing up to 32 individual coaxial lines, also includes a network of wall outlets, Morgan explained; thus, when a 3270 has to be moved, it can be reconnected to the network simply by being plugged into a different, previously installed wall outlet.

Both AT&T Information Systems officials agreed that adding a switched synchronous interface to ISN would make it much more attractive to IBM customers. At the moment, ISN can connect with IBM terminals supporting Systems Network Architecture and bisynchronous protocols only on a point-to-point basis, through converters that make the asynchronous devices look like 3270s.

Another reason for increasing ISN's synchronous terminal support is that it would then be better adapted to carrying voice traffic, a major goal of all local-area network developers.

During a recent interview with Computerworld, Morgan agreed that ISN has the capability to handle packetized voice, but he said that AT&T Information Systems has no plans at present to offer voice-based services on its new local-area network. Such an offering will have to wait for "the next generation of [private branch exchanges]," he added.

UPS arms brokerage's data center against brownouts

By Edward Warner
CW Staff

NEW YORK — New York in the summer is not a place known for the smooth flow of electricity. Brownouts, caused by the demand of millions of air conditioners, have been known to strike, and power dips are not uncommon.

So when the international brokerage firm of Merrill, Lynch, Pierce, Fenner & Smith, Inc. wanted to guarantee a supply of uninterrupted power for its Manhattan data center, one of the largest in the East, it designed a system that would protect against dips and surges — and generate enough power to run the data center for 30 hours without refueling.

Merrill Lynch's uninterruptable power supply (UPS) relies on a roomful of 225 lead-acid batteries — 118,000 pounds of them — to provide power during the first 1½ minutes of a blackout or brownout. After that, a team of six gas turbine generators, fired up automatically three seconds after the outage starts, provides 80% of the building's power until their 20,000 gallons of fuel run out.

The size and capacity of the Merrill Lynch UPS match the enormity of the data center itself, a building that uses 6,000 kVA of electricity daily, houses 500 disk drives and 128 tape drives and which, according to one Merrill Lynch staffer, dwarfs all other such East Coast facilities except that of the Internal Revenue Service.

Without UPS

Without UPS, a sudden dip, however brief, in the power supply to the center's four IBM 3081s and four IBM 3083s could knock out those mainframes for hours and cost the brokerage a great deal, noted Leonard E. Accardo, vice-president of Merrill Lynch's information processing group. Merrill Lynch, Accardo said, would not only have to pay for the losses of its clients who had not been able to consummate stock trades, but would also face the ire of the Securities and Exchange Commission, which requires that trades be completed within a specific period of time.

The UPS, Accardo recalled, came on-line in 1972, when the data center moved to its present 140,000-sq-ft location in a former warehouse here. It got its greatest test, he said, in the New York City blackout of July 1977. While the city endured 26 hours without power after lightning struck a transformer, the data center remained up and running, possibly the only facility other than hospitals to achieve that distinction.

"It was terrific; we were able to process without any interruption," recalled Accardo, who was called from his bed at 4 a.m. to come in to work during the outage. During the blackout, he said, two other New York financial organizations, neither of them brokerages, also temporarily relocated their data processing to the Merrill Lynch Data Center until the city's lights came back on.

The man with day-to-day responsibility for the UPS, Leslie D. Davidson, manager of the data center's engineering and support, said gas turbines from Caterpillar, Inc.'s Solar Turbines International division were chosen for power generation because of their reliability and their smooth flow of power, two advantages, he said, they held over the less costly diesel generators. In the interval before the turbines cut in, the storage batteries power only the building's critical systems: its computers and data storage units. The batteries can last 30 minutes.

Other Wall Street brokerages have since acquired UPS-type systems, although few have power generation capacity, Accardo said.

Since 1977, Davidson said, New York City has had four power outages, the longest lasting for four hours. It has also had eight or nine brownouts in which power dropped at least 10%.



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Administrators: Integrate your data bases

By Mitch Betts
CW Washington Bureau

ARLINGTON, Va. — Data administrators must assume the lead role in strategic planning for the conversion of fragmented data bases into a single, integrated corporatewide data base.

That was the message delivered to attendees at last week's Second Annual Conference on Administration and Control of Data Bases here. James R. Bailey Jr., who is with the MIS planning department at Montgomery Ward in Chicago, said, "My experience has been that MIS applications people don't understand the [data administration] function at all. . . . The data administrator is going to be the planner in MIS."

A logically integrated data base would feature standard data definitions and a single source for each piece of data through standards developed by the data administrator, he said. This conversion will be a "long, laborious process," Bailey added.

Throughout the conference, sponsored by the Institute for Technology Integration, speakers distinguished between the data base administrator, who holds the technical role of overseeing the data base management system, and the data administrator, who has the administrative role of implementing standards so that the data base is a valuable resource for users.

In the strategic plan, the data administrator should plan for future data base systems that will meet the needs of business decision makers and set priorities for the data bases that most need conversion . . . [and] should design a data architecture that will support those objectives.

In the strategic plan, the data administrator should plan for future data base systems that will meet the needs of business decision makers and set priorities for the data bases that are most in need of conversion, Bailey said. After studying the business' overall objectives, the data administrator should design a data architecture that will support those objectives, he added.

Ideally, the architecture would be modular — separating each process of the data base — and flexible, so that corporate reorganizations and other changes can be absorbed easily, he said.

But because the MIS department will likely be reluctant to take on these extra duties, Bailey suggested that data administrators obtain a sponsor, such as the corporate president, to lend clout to the effort.

The data administration function can be moved up higher in the corporate organization if data administrators sell the prospect of an improved data base as a business resource that provides a competitive advantage and, thus, higher profits, he said.

A key benefit of the standardized data base is the ability to use such fourth-generation languages as application generators, information generators and query languages, other speakers said.

Stuart A. Frager, senior consultant with the Plagman Group consulting firm in New York, said fourth-generation languages should be evaluated to see if they will actually reduce programming labor costs, cut the applications backlog and give executives easy access to the data.

"The benefits are great, but adequate planning is needed to ensure acceptable levels of performance using fourth-generation languages," he concluded.

At a roundtable discussion among data administrators and consultants, the talk turned to the difficulty of achieving an integrated data base with a standard data dictionary. Barbara Nichols, data resource management consultant for Digital Equipment Corp., said that because of DEC's decentralized nature, "Centralization and standardization are tough features to get."

In response, Bernard K. Plagman, president of the Plagman Group, suggested that data administrators start small by instituting data standards for a single applications programming project. "Get a program manager to commit to [a project]," Plagman said, and then sell the success of that project to the rest of the organization.

In addition, data administrators can show management what the cost is — in higher software development and maintenance costs — when it lacks standardized data bases, according to Jay-Louise Weldon, a New York-based consultant.

Richard Chandler, data administrator for Rochester Gas & Electric Co., said the utility is now requiring all new programming projects to use the standard data dictionary. "Standards make the systems development and maintenance jobs easier," he said.

The discussion also turned to complaints about end users who circumvent the DP shop by initially using report generators for small applications, but later want to share data with the corporate data base.

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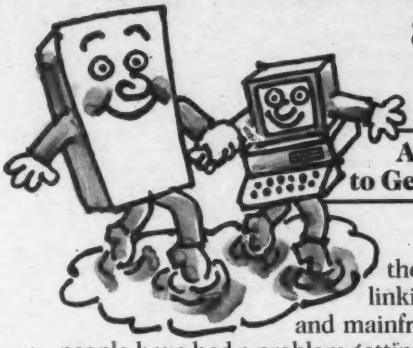
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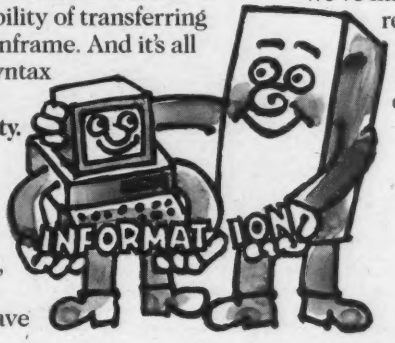
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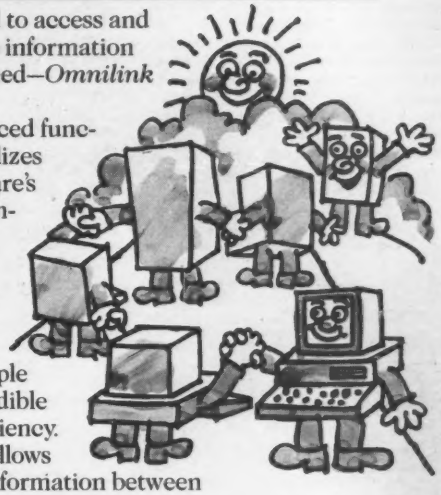
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Corporate use of computer-based training remains low

High end-user training demand gives rise to predictions for pace to pick up

PRODUCT SPOTLIGHT

By Jeffry Beeler
CW West Coast Bureau

Although their history stretches back more than a decade and their potential benefits are legion, computerized instruction aids have yet to make major inroads among the Fortune 500.

Rare is the large corporation where computerized instruction has failed to establish even a nominal presence. But almost equally rare is the big commercial enterprise where the use of computer-based training (CBT) tools has progressed much beyond its infancy.

"I have often described [CBT] tools as the largest installed base of unused systems in the country," stated Gloria Gery, vice-president of Courseware Developers, Inc., an independent consulting firm headquartered in Manchester, Conn.

"My typical description of companies using CBT really hasn't changed much since 1974," said Travis Piper, president of Creative Approaches, Inc., a Rochester, N.Y.-based consulting firm. "They typically have 1½ people who have written 1½ courses for 1½ terminals that are used by 1½ students per week."

The reasons for the corporate world's lukewarm reaction to CBT are many. Piper attributes the phenomenon to lack of management commitment among user organizations and to long development lead times: Just one hour of computer-based course material, he said, can consume 50 to 200 hours of production effort. Gery blamed the feeble showing on a past shortage of effective CBT courses and on an equal dearth of easy-to-use development facilities.

User fears

And Gary Brown, vice-president of Los Angeles-based Crwth Computer Coursewares, Inc., traces the shallow market penetration in part to user fears of failure. "CBT development projects are highly visible within organizations because they are frequently associated with information centers," Brown said. "So companies tend to proceed very slowly and carefully with the projects to avoid falling on their faces and making themselves look bad."

But despite its sluggish pace of user acceptance thus far, CBT will expand its presence in the big business arena exponentially in the near future, Brown predicted. Piper agreed: "Within the next two or three years, I expect the phenomenon to start coming to the forefront inside most large corporations."

Brown's and Piper's optimism springs from a number of sources. First, the explosive growth in the use of business-oriented microcomputers has unleashed an unprecedented end-user training demand that neither corporate MIS departments nor traditional teaching techniques have even come close to satisfying, Brown maintained.

Edge on other methods

Second, CBT reportedly holds a significant edge in effectiveness over more conventional forms of instruction like classroom lectures and video-based presentations. It easily accommodates changes in course material. It allows trainee performance to be centrally monitored and administrative records to be automatically updated. And it permits a high degree of interaction between student and system, according to Christopher Howey, a professor of instruction and training technology at Governors State University in Park Forest, Ill.

Moreover, it lends itself well to large user organizations that have to disperse their instructional material to many employees over a wide geographic area, Brown said. One such corporation is San Rafael, Calif.-based Fireman's Fund Insurance Co., which recently drafted a plan to use CBT tools to train its agents in some 2,000 U.S. field offices. For the moment, the project has been put on hold, "but we'll be a lot better off four years from now when the plan finally has to be implemented," according to Fireman's Fund Vice-President Michael Dowling.

Simulation capacity

Of all CBT's many purported strengths, however, none outshines its unsurpassed capacity for simulation.

"Universities are constantly publishing studies showing that students learn significantly faster with CBT than with other forms of instruction," according to Crwth President Marsha Seidman. "The reason CBT is so much faster is that it is so effective in simulating what you want the student to learn."

Particularly amenable to computerized instruction are subjects that require employees to interact with a terminal. "What better way [is there] to teach a person how to use a terminal than to put him in front of a terminal while you train him?" Piper asked.

Categories define CBT tools

Generally speaking, today's computer-based training (CBT) tools fall into three main categories:

- Courseware — a prepared lesson consisting of computer-generated text, graphics or video.
- Authoring systems or languages — the computer-driven facilities that allow writers or programmers to develop courseware.
- Presentation systems — software packages that adapt courseware to run on a particular make or model of processor.

Gary Brown, vice-president of Crwth Coursewares, Inc. of Los Angeles, likened authoring systems to production studios, presentation systems to motion picture projectors and courseware to finished movies.

Lack of interactivity seen flaw of user-developed CBT programs

By Jeffry Beeler
CW West Coast Bureau

Many user efforts to write computer-based training (CBT) courses have ended in disaster because the authors "failed to understand the intrinsic design properties of their [development] medium," according to professor Christopher Howey of Governors State University in Park Forest, Ill.

More than anything else, the trait that sets CBT apart from all other teaching media is its capacity to allow students to interact with their course material, said the member of the university's instruction and training technology department.

"Many of the designers who are creating courseware inside the [user] companies are educators who were trained in text-based instructional techniques," Howey said. "They're well versed in traditional training modes but not in interactive, computer-based instruction."

All too often, therefore, these computer-naive authors produce courses that are sorely lacking in CBT's hallmark ingredient — interactivity — Howey said.

With many user-written CBT lessons, Howey said, "A student just sits there in front of a terminal and reads text. About the only interaction the trainee has with the computer is to hit the carriage return once in a while to turn to the next page."

Howey criticized the "page turning" approach to CBT course design as a very poor use of computers and of their "inherent capabilities as teaching tools."

With the recent profusion of microcomputer-based authoring systems, he added, the tendency for user organizations to create ineffective courseware has increased. Because they are geared primarily for nontechnical end users, small-scale authoring systems de-emphasize the need for extensive programming skills.

The trait that sets CBT apart from all other teaching media is its capacity to allow students to interact with their course material.

But in their efforts to make their products easy to use, authoring systems suppliers typically have had to sacrifice a large measure of functionality, Howey said. The result is that the development tools often encourage their customers to write the kind of courseware that only superficially takes advantage of a processor's training potential.

"[The authoring systems] allow courses to ask multiple-choice and true-or-false questions," Howey said. "But they don't permit a great deal of interaction or branching alternatives or animation, all of which computers are very good at."

Not everyone, however, shares Howey's dim view of many microcomputer-based authoring facilities.

"I disagree with the contention that authoring systems and their fixed instructional strategies stifle creativity in courseware design," said Mort Goldstein, director of Control Data Corp.'s Plato product line management. "Many of the tools provide a substantial amount of development flexibility and a high degree of interactivity."

Whatever the final verdict on the effectiveness of microcomputer-based authoring systems, user organizations are increasingly delegating the coding portion of their courseware development projects to outside vendors. So says Travis Piper, president of Creative Approaches, Inc., a Rochester, N.Y.-based consulting firm.

By doing the necessary CBT programming work externally, users can focus their full attention and energies on the nontechnical facets of courseware creation, including the writing, Piper said.

Many large business organizations, however, still prefer to do the bulk of their CBT course development in-house. At Pacific Bell Telephone Co.'s comptrollers training center, for example, internal design efforts account for about 70% of the site's total courseware production, according to associate staff manager Gwen Molina.

"We try to use commercial packages whenever we can find them because they're a lot less expensive [than custom-developed courses] in the long run," Molina said. "But many of our course needs are so company-specific that we can't meet them with off-the-shelf products."

Micro growth boosting market for end-user CBT tools

By Jeffry Beeler
CW West Coast Bureau

Although computer-based training (CBT) has existed in one form or another since the early 1970s, the field began to make its presence felt among nontechnical end users only about three years ago.

Not coincidentally, CBT's recent rise to end-user prominence has paralleled the growth in popularity of business-oriented personal computers.

Until 1981, the repertoire of CBT authoring facilities employed by user organizations consisted chiefly of five models, all of which ran either on mainframes or minicomputers. Included among the large-systems authoring languages were: Boeing Computer Services Co.'s Scholar/Teach 3; Goal Systems International, Inc.'s Phoenix; IBM's Interactive Instructional System; Sperry Corp.'s Author System for Education and Training; and Honeywell, Inc.'s DPS 6/CAN-8.



Since then, the selection of commercially available authoring systems and languages has steadily expanded. Today, in fact, business users of CBT can chose from among 42 varieties of courseware development aids, according to a recent survey published in Boston-based *Data Training* magazine.

A few of the authoring facilities that have arrived on the scene since 1981 are as mainframe- or minicomputer-oriented as any of their antecedents. Control Data Corp.'s Plato Courseware Development and Delivery system, for example, was introduced in 1982 and runs on CDC's Cyber 700 and 800 family processors. Digital Equipment Corp.'s VAX Producer, meanwhile, first appeared in January and operates with CPUs as large as a VAX-11/780.

With a few notable exceptions, however, all the authoring aids that have come into being during the past three years reside on microcomputers, according to Gloria Gery, vice-presi-

See **CBT** page 22

SAMPLER OF COMPUTER-BASED TRAINING OFFERINGS

Vendor and Address	Product Name	Highlights	CPU Requirements	Terminal Support	Graphics Features	Support and Service	Courseware	Price
Advanced Interactive Systems, Inc. 46 Darby Road Paoli, Pa. 19301	Avid (Version 4.1)	Natural-language processor, branching, sequential and random-access manipulation of data files, full-screen text editing, frame title, backup one frame.	PDP-11s under RT-11, RSX-11M; VAXs under VMS; DEC* Professional 325 and 350 under P/OS.	DEC* VT-100.	Supports all graphics. Video features available on VT-100, DEC PRO, including charts, animation, windows, illustrations. Color also available.	On-line Help facilities. Users can call collect for help. One free day of training available.	No vendor-written or third-party packages available at this time. Expect to have course about VMS operating system later this year.	For Pro 350, $240-$800; For PDP-11, RT-11, $840-$2,800; For PDP-11, RSX-11M, $1,140-$3,800; For VAX, VMS, $1,650-$5,500.
Boeing Co., Inc. Computer Services Division 7755 E. Marginal Way S. Seattle, Wash. 98124	Scholar/Teach 3	Available in both IBM Personal Computer and mainframe versions. Courses developed on one machine can be uploaded or downloaded to the other. Equally applicable course administration and student training.	All medium- and large-scale IBM or plug-compatible processors.	3270 series or compatibles and virtually any other terminal that runs on an IBM 4341 or larger machine.	Currently limited to keyboard graphics only. Graphics interface supporting color to be released during fourth quarter.	User consulting service provided through toll-free hot line. Training comes in two forms: stand-up instruction at customer site or six-hour computer-based course.	Can be developed on user's own processor or by tying into Boeing's nationwide time-sharing network, Mainstream-CTS. Custom courses developed by Boeing itself.	IBM systems except ACP; $1,000/mo for Author/Presentation Package; $35,000 perpetual license. Under ACP, $1,250/mo; $45,000 for perpetual license. IBM Personal Computer version $495.
Control Data Corp. P.O. Box 0-HQA-021 Minneapolis, Minn. 55440	Plato Courseware Development and Delivery (PCD2)	Can be used in conjunction with PCD1, the microcomputer version of Plato's mainframe-based authoring system. Video can be incorporated into lessons through videodisk authoring service.	Courseware written on CDC Cyber 700s, 800s.	Courseware delivered on IBM Personal Computer, Apple Computer, Inc. IIe or II+; Zenith Data Systems' Z100 or Z150; CDC 110. Also delivered through terminals in 100 CDC learning centers.	Animation, color, free-hand drawings, cartoons, line graphics (boxes, circles, etc.).	On-line reference documentation, Plato hot line service.	Available with more than 8,000 hours of standardized courseware. PCD2 seminar training available for courseware writers.	For authoring system alone, $6,500 one-time license fee.
Digital Equipment Corp. Maynard, Mass 01754	VAX Producer	Includes "VAX Design" authoring language. Supports audio and video through DEC PRO 350 and an attached videodisk player. Videodisk-based system supports touch-screen terminal, mouse, joystick, graphics tablet.	VAX-11/730, -/750, -/780.	VT-52, VT-100, VT-125, VK-100, PRO 350 operating in terminal mode.	Color graphics, animation created through "VAX Draw" graphics editor.	Support service in Atlanta reachable through toll-free number. Maintenance handled by software specialists in local DEC offices.	General lesson material available through "Interactive Video Information System's" educational courseware library. Custom courseware written by vendor.	$14,000 license. Documentation and media cost an extra $1,000.
Goal Systems International, Inc. 5455 N. High St. Columbus, Ohio 43214	Phoenix	Two languages for course writing: "Ease," "Phoenix Authoring." Courses can be downloaded from mainframe to IBM Personal Computers. Supports branching capability, courses written on IIS.	370, 4300, 303X, 308X, Running VS1, VM/CMS, MVS. Interfaces to Vtam, Tcam, Btam, TSO, CICS.	3270, IBM 4700, 3101, Ascii teletypes, including Decwriter II and Texas Instruments, Inc. Silent 700.	No graphics support available at present.	Toll-free phone number. Documentation includes screen samples. On-site training after installation.	Available from third-party vendors like Cnwth Computer Coursewares, Inc., Deltak, Inc. and IBM. Also supplied by Phoenix Courseware Group.	$1,375/mo for both authoring and presentation system. Permanent license costs $36,500.
Honeywell, Inc. 200 Smith St. Waltham, Mass. 02154	DPS 6/ CAN-8	Two authoring modes: one for programmers, the other for nontechnical personnel. Supports cassette players and TVs to allow course material to be augmented with videotape presentations.	Any member of Honeywell's DPS 6 CPU line (Requires minimum of 128K bytes of main memory).	Virtually any asynchronous terminal, Honeywell or otherwise.	Programmer-oriented authoring language supports graphics commands for color or monochrome screens. Digitizing pad available with nonprogrammer version of system.	Both user training and problem resolution handled by local Honeywell branch offices.	Twelve semester-length courses on technical subjects available through referral agreement with Canadian third party. Other courses available from Second Canadian Organization.	$9,000 for 32-terminal system; $35,000 for 128-terminal version.
IBM 225 John W. Carpenter Freeway E. Irving, Texas 75062	Interactive Instructional System (IIS)	Encompasses both IIAS (authoring system) and IIPS (presentation system). Compatible with IBM's Personal Computer instructional system, which permits uploading or downloading of courses between Personal Computer and mainframe. Backward paging up to 10 screens.	4300, 303X, 308X running VM/370 with CMS; MVS with TSO; DOS/VSE with ACF/Vtam; OS/VS with IMS, CICS, ACF/Tcam or ACF/Vtam.	2741, 3270 series.	IIS Release 2, with graphical data display manager (GDDM); supports color graphics.	Diagnostics guide, toll-free hot line, IBM field representatives.	Course structuring facility (CSF) and simulation/exercise facility (SEF) allow authors to create their own courses. IISaut teaches use of CSF, SEF, IISADM, IIS INT trains administrators and students, respectively.	IIAS, $430/mo; IIPS, $251/mo; GDDM, $139/mo.
Sperry Corp. Suite 204 3001 Metro Drive Minneapolis, Minn. 55420	Author System for for Education and Training (ASET)	Development language geared to nonprogrammers. Dynamic branching control. "Report generator" feature collects, prepares information on student performance, course evaluations.	Univac 1100 Series.	Uniscope 200, 400; Tektronix, Inc.'s asynchronous Ascii teletype.	Supports Tektronix "Basic Graph" package.	Central consulting staff for answering user questions and fixing software bugs. Education center conducts periodic "How-to-use-it" courses.	A few basic packages accompany release tape. Canned lessons available for teaching computer use. Selected universities engaged in third-party development.	$525/mo.

* Digital Equipment Corp.

CW CHART

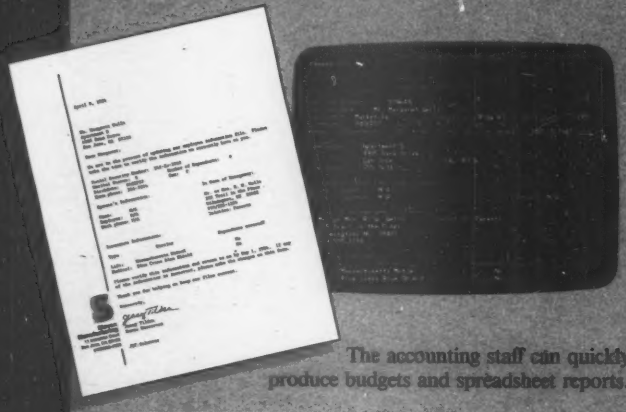
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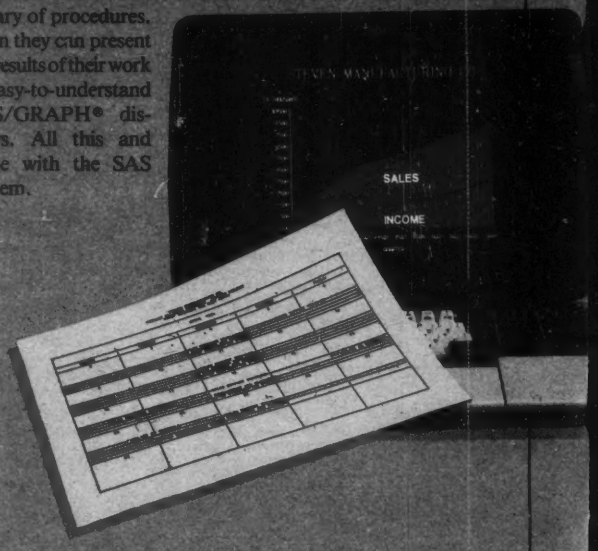
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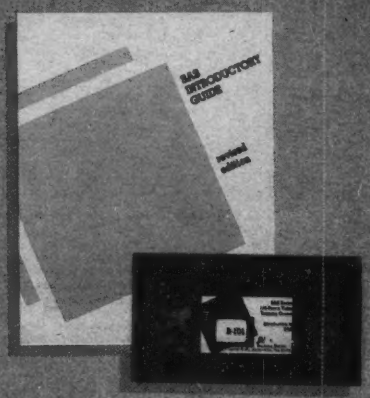
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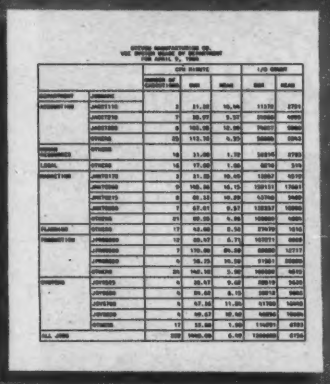


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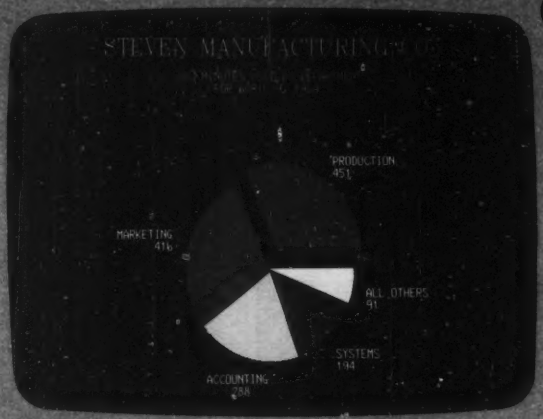
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CBT from page 19

dent of the Courseware Developers, Inc., in Manchester, Conn.

Several of the newcomers to the courseware development arena, like IBM's Personal Computer Instructional System (PCIS), are basically scaled-down variations of authoring languages that have long been available on mainframes. Because PCIS and its ilk are typically compatible with their large-systems counterparts, users can reportedly transmit CBT course material back and forth between their central and remote computing installations.

From a user's standpoint, the advantage of having such an uploading and downloading capability is that it provides a "centralized means of managing instructional resources," according to professor Christopher Howey of Governors State University in Park Forest, Ill. "Large organizations need to be able to centrally store test results so they can decide which employees are qualified to receive a particular type of training and which aren't."



The ability to exchange CBT material between a personal computer and a host processor also reportedly boasts several other important advantages. A user organization, for example, can create courseware at its central site — and in so doing, take advantage of a mainframe authoring language's powerful development features — and then download the lesson for delivery on a micro.

In addition, CBT development tools may soon gain the ability to upload personal computer-generated courseware to a large-scale CPU, where the material would reside centrally as a "data file in a data base management system [DBMS]," Gery predicted. If a stored lesson later required revisions, the owner would need merely to rewrite its one mainframe-resident copy and then could immediately distribute updated versions of the courseware to all remote end users.

For the most part, though, the ability to store CBT courses as data files in a host DBMS still lies beyond the bounds of current technology, Gery said.

Although a handful of today's micro-based authoring systems were designed expressly to work in concert with their mainframe-oriented sister facilities, the vast majority of late-model development aids operate strictly in stand-alone mode.

As the roster of personal computer-class authoring tools has steadily grown, CBT has substantially expanded the scope of its potential users and applications. In the past, authoring products were geared primarily for programmers, who used the packages to create lessons for highly technical subjects like job control language and IMS, according to Marsha Seidman, president of Los Angeles-based Crwth Computer Coursewares, Inc.

As the roster of personal computer-class authoring tools has steadily grown, CBT has substantially expanded the scope of its potential users.

Even today, DP-oriented topics still dominate many business organizations' courseware development efforts. Pacific Bell Telephone Co.'s comptrollers training center, for example, aims about 90% of its courses at its in-house programming and operations personnel, according to Gwen Molina, associate staff manager.

Increasingly, however, CBT authoring systems are touching the lives of nontechnical end users, who are quickly becoming major consumers of courseware ranging in subject matter from sales presentations to microcomputer software packages, Seidman said.

Because they sell primarily to computing novices, suppliers of personal computer-based authoring systems have sought to make their products as different from traditional programming languages as possible. But, Gery said, "With most CBT development tools, there's definitely a power/simplicity trade-off."



Xerox taps installed hardware in ambitious CBT effort

Along with IBM, Xerox Corp. qualifies as one of the true pioneers in the business use of computer-based training (CBT) tools. Xerox's involvement with CBT dates back to the mid-1970s when the company formulated its first nationwide strategy for updating its employee training program through the liberal application of high technology.

Within a year or so of its inception, however, Xerox's ambitious modernization plan was abruptly shelved. But in 1978, the company's interest in CBT began to reassert itself.

What precipitated the resurgence was Xerox's dawning recognition that the hardware already installed in its nationwide network of field locations constituted an untapped training resource. If, the company reasoned, it could reprogram the existing equipment to do double duty as instructional tools, it could train its branch office personnel in their own work places.

The advantage of on-site employee instruction is at least twofold, according to Dan Vitello, manager of education services for Xerox's Business Systems Group.

First, the company is spared the considerable expense of transporting trainees to its national training centers. Second, the approach entails no additional investment in capital equipment. So compelling did the case for an in-house CBT program eventually prove, that the firm soon began translating its ideas into action.



Since then, Xerox has grown to become the world's largest industrial user of computer-driven instruction aids, Vitello said.

At one of its training centers in Rochester, N.Y., the company has already plowed some 70 man-years of development effort into the delivery of 338 CBT courses covering approximately 130 disciplines. Most of the courses are aimed at the firm's nationwide sales and service representatives and at the 4,000 administrative aides who support them, Vitello said.

Between Jan. 1 and Sept. 8, Xerox's internal CBT activities accounted for 60,764 hours of CPU connect time, "and if use continues at its current pace, we might even exceed the 85,000-hour mark," Vitello said.

Several hundred miles south of Rochester, in another Xerox training facility in Leesburg, Va., the CBT story is altogether different. There, the company's trainers emphasize hands-on instruction, which lends itself far more readily to conventional teaching techniques like classroom lectures than to CBT, according to Vitello.

To date, therefore, the Northern Virginia site has largely avoided the use of computerized instruction, although "we expect the situation to start changing late this year," according to Bob Sohl, training director for Xerox's General Services Division.

Of the two Xerox training centers, the Leesburg facility comes far closer to typifying the average commercial user of CBT tools than does its Rochester counterpart.

SR to look at data terminals

Data processing may be facing a terminal case. Data communications terminals are being squeezed on the one side by cost factors and microcomputers, on another side by pressures for end-user computing and on still another side by alternative means of data entry and data manipulation.

Computerworld's November Special Report will focus on data communications terminals and examine their special situation in today's marketplace.

The Special Report will look at how data communications terminals are faring in their competition with personal computers.

The report will consider the question of who should use communicating terminals and the many new ways the terminals are being put to use.

Contributions to the Special Report should take one of two forms: a tutorial article, discussing an issue or trend; or an application story, outlining a particular user firm's experience with a DBMS.

Articles must be typed, double-spaced and range in length from four to six pages. Artwork, such as charts, graphs and photographs, is also welcome.

Authors should include a brief biography and a telephone number at which they can be reached. The deadline for submissions to the November Special Report is Oct. 5.

If you have a story you would like to tell, or if you have any questions to ask, send them to Janet Fiderio, Special Reports Editor, *Computerworld*, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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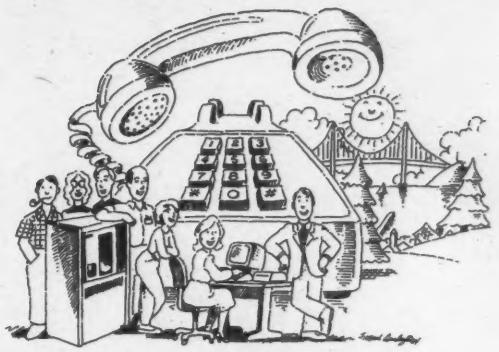
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Expo visitors rate recent software developments

By John Gallant
CW Staff

CHICAGO — What do microcomputer - to - mainframe links, improved graphics capabilities and simplified documentation have in common? They were all listed among the most important new developments in software technology by visitors interviewed by *Computerworld* at the recent Software/Expo '84 conference here.

"The most important thing I have seen is the new focus on simplified documentation," said Stan Jekot, data processing manager at Gander Mountain, Inc. in Wilmot, Wis.

"The companies are getting rid of computerese and making it easier for novices to use software without knowing how the machine itself actually works," Jekot continued. "I have seen that in the product literature here and in the documentation for the software we have reviewed and purchased recently."

Micro-mainframe links

Michael O'Halloran, director of MIS at Rosemount, Inc. in Minneapolis, said, "For me, the single most important topic in software today is the linking of micros and mainframes. The link products are getting there, so to speak, technologically. The progress that vendors have made in the last year has increased the capabilities of the links tenfold. The links are what I am here looking at for my company."

According to Richard Royle, senior vice-president, Rosemount, "I have to agree with my colleague; micro-mainframe links are the most important and interesting issue in software today. The main purpose of automating information systems is to transfer information to the people who need it, including micro users such as myself.

"The link products are showing us we can do that," he added. "The only weakness today is security, having non-MIS people accessing corporate data. But I am certain those security problems will be solved in the near future."

Security software

Gene Schultz, senior systems analyst, U.S. Gypsum Co. in Chicago, said, "I think the thing I am most impressed with is the security software that is just now becoming available.

"I am responsible for security at our data center, and it is good to see new packages and enhancements to existing software being announced. The security software I have seen is much improved and far easier to use. It is heartening to see security software coming into its own because data is such an important asset," he asserted.

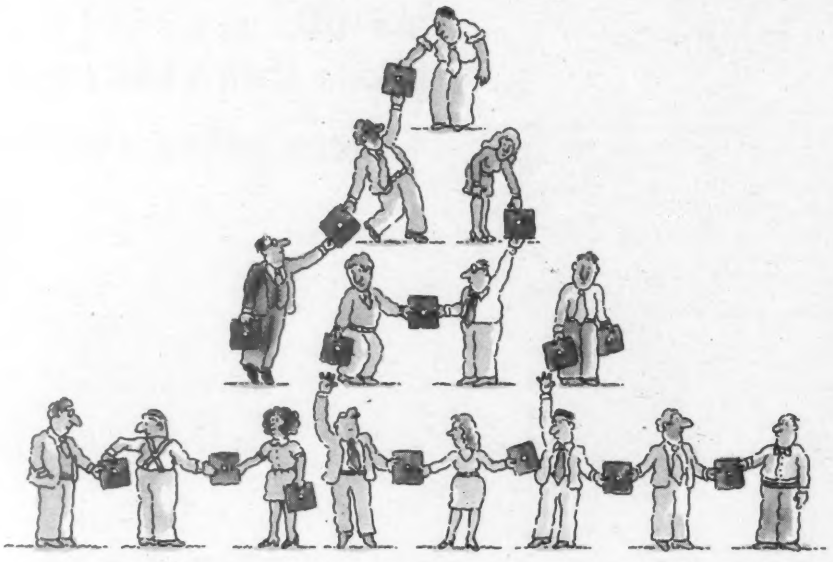
Betsy Smagalski, manufacturing computer coordinator at Delco Electronics, a division of General Motors Corp. located in Milwaukee, pointed to improved graphics as the most important software development.

"More and more of the business applications packages seem to be moving into the graphic display of data, getting away from just reports and statistics on the screen," she said. "The quality of the graphics is improving rapidly. I am here primarily to review graphics software for my company."

C. W. Smith Jr., director of data processing for the City of Virginia Beach, Va., said, "The primary focus of software has become the micro-mainframe link, the ability to download data and manipulate it at the micro for forecasting and other applications. The links will allow us to utilize the flexibility of the micro and the power of the mainframe.

"Most of the products I have seen are fairly decent," he added. "I am also looking into things such as fourth-generation languages and relational data base management systems because I am interested in improving the productivity in our development center. I hope those things will help."

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Users' rising expectations seen spurring software crisis

By John Gallant
CW Staff

CHICAGO — Success in developing software systems may be the key factor fueling the quality crisis that haunts software developers and users today.

That message came during Gerald Weinberg's keynote address at the recent Software/Expo '84 conference held here. Weinberg, founder and principal with the Lincoln, Neb.-based consulting firm Weinberg & Weinberg, told conference visitors that the poor quality exhibited by many current software systems is due in large measure to their growing complexity. That complexity stems from demands by increasingly sophisticated end users for added applications functionality.

"The quality crisis is sometimes caused by a breakdown in the development organization," Weinberg said. "But usually it happens because of our success in developing earlier applications. When you successfully build one application, you subsequently must build a bigger one. Users will demand that the next application have more functions and more features, so the development project gets bigger and more complex. So, in many ways, the quality crisis is really a crisis of rising expectations."

Without strict emphasis on quality from the outset, Weinberg said, the development of functionally complex applications software often spawns three major problems for designers. First, as the number of features or functions increases, each design or programming error within the application takes longer to uncover — if the error is uncovered at all.

In addition, each error in the application requires a greater effort to correct because each fix affects other interrelated parts of the application. Finally, Weinberg said, every correction undertaken at the completion of the development process is more likely to create new errors in other functions of the application.

"A greater number of errors, each of which takes longer to find, vastly increases the time developers spend correcting errors in the application," Weinberg said. "In addition, the administrative burden on programmers grows as they spend less time solving problems and more time answering questions and processing error reports. All of this leads to software of lower quality that becomes increasingly difficult to maintain," Weinberg said.

Weinberg described a vicious — though not uncommon — cycle in the software development process that dooms many applications to failure and even rejection by end users: Pressures to complete an application on schedule lead to a decision by project management to ship error-riddled software that works, but does not really meet end-user requirements. Having delivered such an application, trouble reports begin to pour in, and programmers are drawn from their current development work to solve user problems. The application under development begins to fall behind schedule and the cycle begins anew — another poor-quality application is shipped to meet its deadline.

What are Weinberg's recommendations for alleviating the software quality crisis? First, project management must precisely monitor and control the application's configuration from the beginning of the development project. Next, designers should ensure that the individual parts of the applications are of high quality before they are combined — perhaps through several levels of pretesting during the project life cycle.

In addition, Weinberg recommended that developers employ error-correction teams rather than simply relying on individuals to debug applications code.

Finally, designers should make use of the many available software tools for finding and debugging errors.



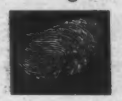
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TDF rules becoming hotly debated issue in world arena

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — "The U.S. holds a coveted market: It is the largest exporter of information in the world," said Bill Burgess, a Bank of America vice-president, at the first three-day World Communications Conference '84 conference held here recently. Burgess quoted French economist Louis Joinet: "Information is power, and economic information is economic power."

Burgess said that while technologically sophisticated countries can collect, store and distribute data through computer systems, most underdeveloped countries are only capable of acquiring and using the resulting information products. Information-producing countries wish to keep their privileged position, he said, while most information-consuming nations, like Brazil, argue for the erection of gateways, tariffs and barriers over transborder data.

Burgess said transborder data flow (TDF) first emerged as an issue in 1973 with the Swedish Privacy Act, which questioned the ethics of storing data about Swedish citizens outside of that nation's borders.

He said, "Telecommunications technology is in a revolution, not an evolution." If we regulate now, we may be wasting time and money as technology rapidly outstrips the regulations intended to harness it, he said.

Conflicting agendas

In a TDF strategy session on regulation and deregulation, Hugh Donaghue, vice-president of Control Data Corp. and vice-president of Government Programs and International Trade Relations in Washington, D.C., said conflicting agendas and priorities within the U.S. telecommunications industry and governmental watchdog agencies were stalling effective legislation and causing the U.S. to violate the nonrestrictive national principles it promotes internationally.

"The U.S. government is the biggest violator of existing international TDF policies," Donaghue said, citing the 1982 Dressler Industries case. In this case, he claimed, the U.S. government used TDF barriers to embargo the trans-Siberian pipeline project by cutting off the transborder information flow between Dressler's U.S. and French subsidiaries, thus stalling the timely delivery of its gas turbine products.

"U.S. policymakers have shown very little cohesiveness so far with TDF issues," said Robert Zimmerman, a representative of the Rome-based Intergovernmental Bureau for Informatics.

The Japanese, the Europeans, newly industrialized nations like India and Brazil and underdeveloped nations in South America and Africa all have some type of centralized telecommunications ministry, Zimmerman said. In the U.S., however, there is no centralized, policymaking agency where other governments can voice their needs, he said. The danger of this, he said, is that underdeveloped nations will develop policies unilaterally, ignoring U.S. concerns.

Arthur Bushkin, president of Telemation Associates in Washington, D.C., said every multinational business — from General Motors Corp. and Ford Motor Co. to world banks and financial institutions like Dun & Bradstreet Corp. — will be impacted by TDF issues during the next decade.

"It doesn't just affect computer and communications manufacturers and suppliers," Bushkin asserted, "but the whole international business infrastructure."

Bushkin said the major international TDF trade principles that will emerge within the next decade are nondiscrimination regulations for domestic and foreign agencies and carriers, enforceable "right of presence" over information and legally enforceable information access guarantees, so that one nation cannot deny information access to another.

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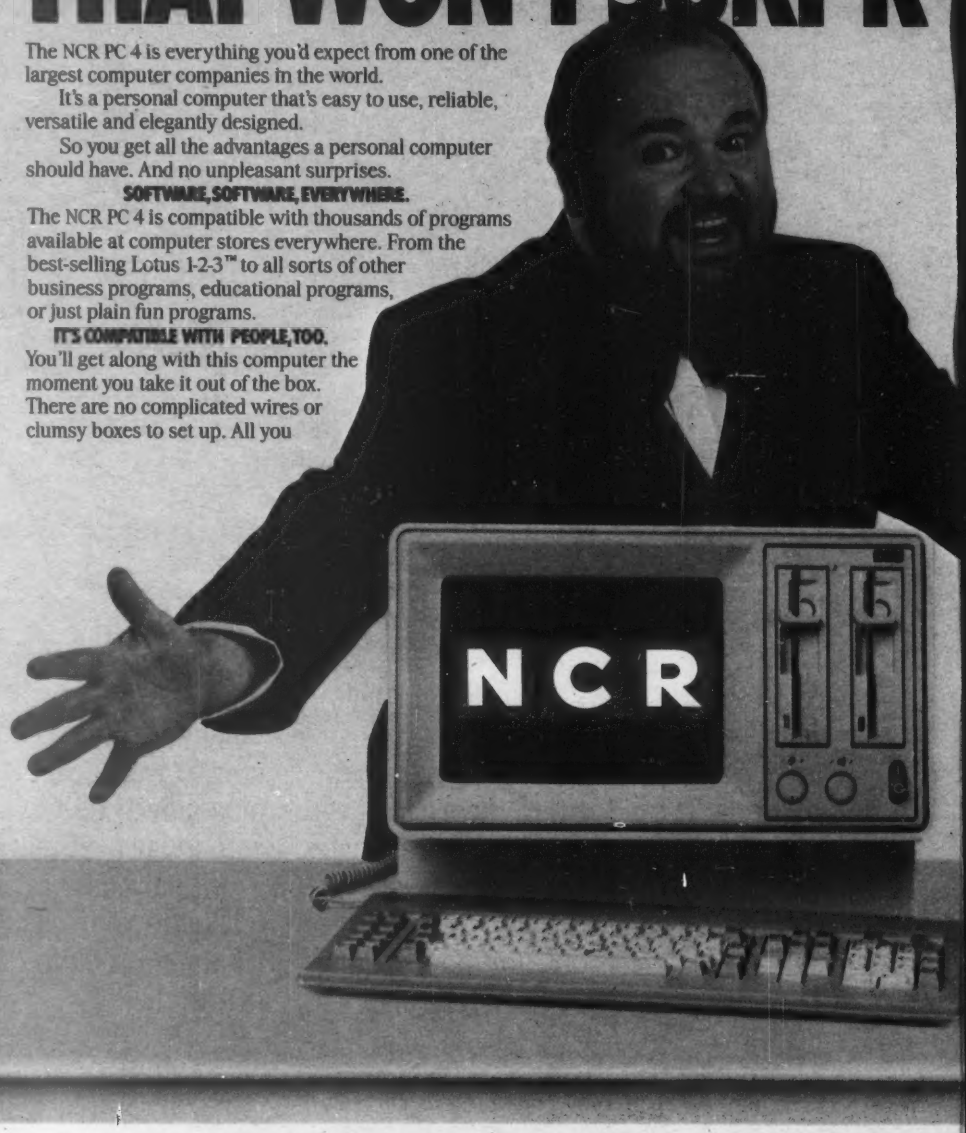
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Telecommunications seen key to economic, social gains

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — If policy-making processes can be speeded up and standardized, telecommunications will have a significant multiplying effect on economic and social developments, according to Richard Butler, secretary-general of the Geneva-based International Telecommunication Union (ITU) during his keynote address at the opening of the three-day World Communications Conference '84 conference held here recently.

Presented by Computers and Communications International, the sessions gathered together about 100 business, technological and government representatives from several countries to forecast global developments and international market trends in the merging computer and telecommunications industries.

Noting how far most Third World countries must go to catch up with developed nations in telecommunications, Butler said that 75% of the world's 600 million telephones are concentrated in eight countries representing less than 15% of the world's population, and three-quarters of the world's 600 million televisions are located in only nine nations.

This lack of adequate communications facilities has "ramifications and consequences extending well beyond the telecommunications sector," he warned.

Donald Sledge, conference chairman and president of Pacific Telesis International, stated that a recent University of Egypt research study indicated that a Third World country's gross national product grows $85 for each $1 invested in telecommunications.

Difficult decisions

To catch up, these nations need to make difficult decisions, he said, sometimes deferring road, hospital and bridge construction to allocate funds for telecommunications.

According to Butler and Sledge, the biggest challenge facing the telecommunications industry today is to develop coherent planning and investment policies in fluctuating markets with rapidly advancing technologies, such as cellular radio, digital and interconnected networks, radio frequency spectrums and geostationary-orbit space telecommunications.

Sweeping changes will result as the widespread introduction of new technologies, such as optical fibers, exponentially increase transmission capacities, Butler warned. This quantum growth in carrier-channel multiplexing will yield diminishing returns for users in the near future, he cautioned, changing the relationship between users and suppliers and increasing the users' responsibility for how they utilize these vast transmission capacities.

'Rate fixing' won't work

The standard "rate fixing" solution will not continue to work in the future, according to Butler, since the future operating patterns of major telecommunications users will have a rippling economic impact on the costs of facilities and systems that are offered to private and small business subscribers.

According to Sledge and Butler, six key issues need to be isolated in the next decade by policymakers in the U.S. and Europe: questions of national sovereignty with regard to transborder data flow, financing, recognizing user needs, incorporating technological advances, training sufficient manpower and developing alternative scenarios for telecommunications into the year 2000.

"A consensus of expertise and regulatory conferences on a vast scale" is necessary to propose new ideas and methods for overcoming deficient past policies and for redressing the underinvestment of the past in order to achieve a balanced expansion of telecommunications networks throughout the world, Butler said.

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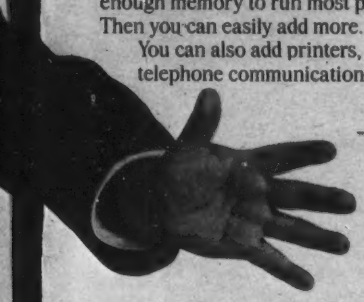
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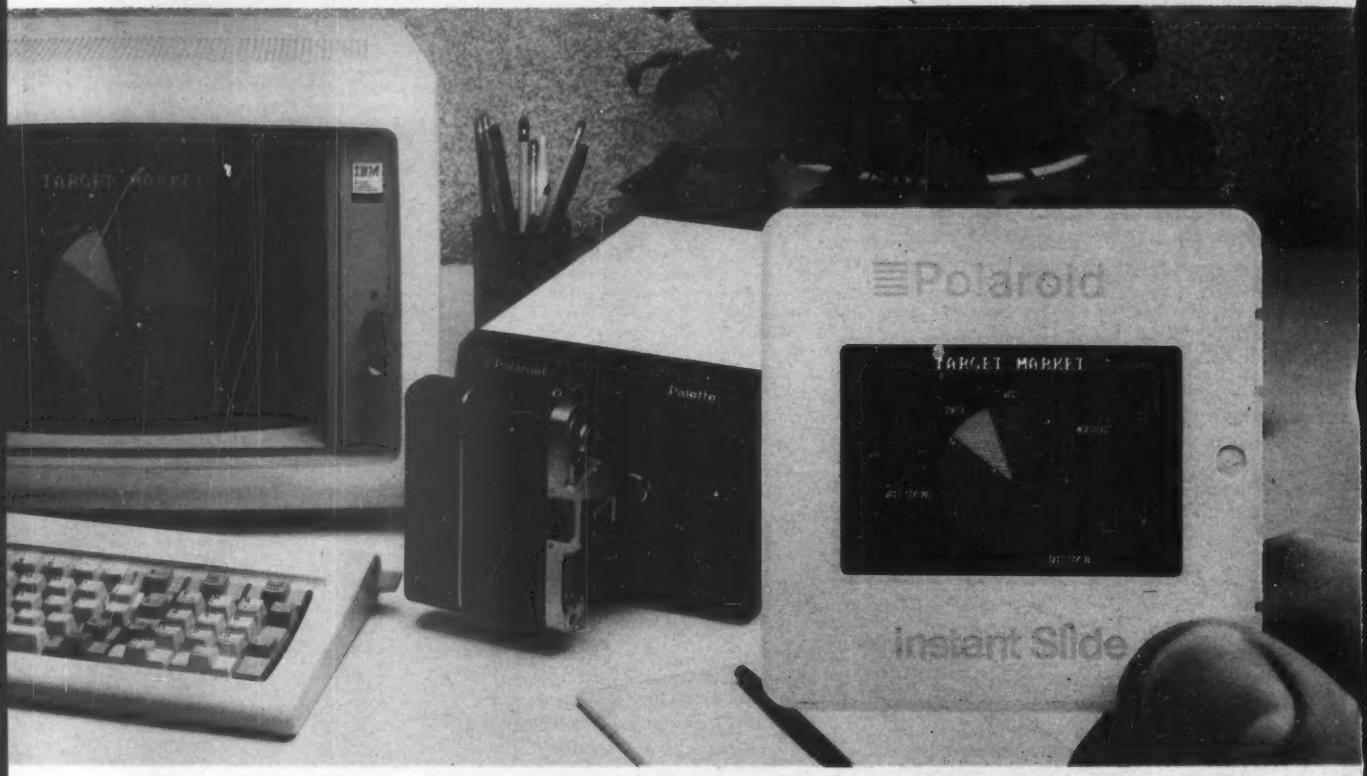


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Weigh Unix drawbacks before installing, panel warns

By Kathleen Sullivan
CW West Coast Bureau

LOS ANGELES — The jury is still out on whether an AT&T Unix-based computer system represents an appropriate choice for handling a company's information resource needs. That was the consensus of a panel addressing an audience at the recent Unix Systems Expo/84 here.

Unix-based systems have both advantages and disadvantages, the panelists agreed. Potential users should carefully weigh the drawbacks of AT&T Unix before reaching a decision to install a Unix-based system, they warned.

The strong points of the Unix system are widely recognized, the panelists said. AT&T's Unix, an interactive, multiuser, multitasking operating system, is available on a wide range of computers, from microcomputers to mainframes.

Applications easily moved

Applications software written in the C language is relatively easy to move from one system to another, the panelists agreed. In addition, they noted, hundreds of tools and utilities for software development have been written to run on Unix.

At present, though, Unix suffers from a lack of sufficient applications software for end users, noted Bill Adams, vice-president of marketing for the Software Express, a third-party software vendor based in Houston.

But that situation will soon change, Adams said, predicting that phenomenal growth in Unix applications software development will provide a wealth of Unix packages.

Skeptical assessment

Although Adams was optimistic about the future of Unix, saying it represented a logical choice for companies that want to deploy a range of systems throughout an organization, other members of the panel presented a more skeptical assessment.

David Fiedler, president of Infopro Systems, a Denville, N.J.-based market research firm, said Unix critics can still point to a number of significant shortcomings in the system that affect its ability to meet the needs of business users.

Even in its latest release of Unix, known as System V, AT&T did not include record and file locking, a critical feature in a multiuser system, he noted.

Unix also presents problems for system administrators, who need to be able to ensure compatibility, yet are faced with a variety of offerings based on different releases of the operating system by AT&T, Fiedler said.

Security is also an issue with Unix-based systems, Fiedler said. Ted Goldstein, an independent consultant based in Santa Cruz, Calif., agreed, noting that security on a Unix system is limited to protection from casual attackers.

"Unix doesn't resist the programmer who really wants to break into a system," Goldstein said.

Lack of standard interface

The lack of a standard user interface for naive users that would span the range of Unix-based systems represents another disadvantge of the system, Goldstein said. Although he predicted that such interfaces will be developed in the future, at present, he said, the technology does not exist that could provide a standard interface.

Unix also requires more support and maintenance than other systems, Goldstein said. A Unix-based system requires "handholding" for naive users, he explained. It is important to have an experienced user on the staff who can help beginning users cope with the system, he said.

Businesses should be prepared to handle the maintenance of the system, Goldstein added. "Unix is not flawless," he warned. "It will break down and will require attention." A business needs to allocate enough money to the system's support and maintenance, Goldstein said.

End users at meet recount trials, tribulations of Unix installation

By Kathleen Sullivan
CW West Coast Bureau

LOS ANGELES — For many end users, the installation and development of an AT&T Unix-based computer system has been a challenging experience, one in which many lessons have been learned.

At the recent Unix Systems Expo/84 held here recently, a group of panelists representing a variety of Unix users met to share some of the insights they gained in the process of adopting a Unix-based system.

Specialized Systems Consultants, a Seattle-based consulting firm, installed a Codata Systems Corp. 3300 computer in its offices about a year and a half ago. Irene Pasternack, one of the firm's founders, had a simple recommendation for her audience: Do not try to start from scratch.

The firm, which offers training and technical consulting to Unix users, undertook the task of writing its own data base management system for its system. It was a time-consuming task, she said.

Although she noted that the process was useful for learning the C language, Pasternack said she would not suggest that new users take the same route and try to design their own software.

Instead, users should rely on software developers to provide applications packages. "Don't try to write it yourself," she advised.

Pasternack also emphasized the importance of having an experienced user on hand to help beginning users cope with the complexities of the system.

The training a user receives will also be a factor in the success of the system, she said. When introducing a new user to Unix, the training should focus on how to use a specific applications program, rather than discuss data processing concepts, she said. A new user will resist learning the system if a trainer begins a session by discussing what makes up an operating system, Pasternack explained.

Imad Bitar, a subproject manager for TRW, Inc., a Redondo Beach, Calif.-based firm, agreed that new Unix users require a lot of handholding.

During the past two years, Bitar has been involved in a project at TRW to make a Unix-based software development system available throughout the company's divisions. TRW has installed a variety of Unix-based systems, including Digital Equipment Corp. VAX-11/780s, Pyramid Technology Corp. 90Xs and a Sun Microsystems, Inc. workstation.

The project, which now supports more than 400 users — from secretaries to upper level management personnel — will be extended to support 1,000 TRW users in 1985, Bitar said.

According to Bitar, the company found it had to work on selling the system to users. "A large amount of time and effort was spent in training," he said.

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Proposed ISO standard elicits differing reactions

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — The International Standards Organization's (ISO) proposed Open Service Interconnect Architecture for remote communications packet-switching networks will become a reality by 1985, Richard Pryor, president of ITT World Communications, Inc., told a panel on global perspectives in the telecommunications industry at the World Communications Conference '84 held here recently.

"Standards help competition," Pryor said, citing the similar evolution of transmission standards in the auto industry, "where park and reverse are always in the same place. That doesn't stifle competition; it helps it." Pryor said the network itself will become a standard, accessed by a variety of protocols and communications devices, such as 3270 terminals, because "people don't want to throw away the investment they've already made in hardware."

The ISO's proposed seven-layer standard defines the interface between processors or terminals and public data networks that offer leased circuit-switching and packet-switching based on protocols, such as asynchronous and bisynchronous communications, and Systems Network Architecture (SNA) to non-SNA communications links.

ISO's standard defines the interface between terminals and public data networks.

Richard Butler, secretary general of the International Telecommunications Union (ITU), based in Geneva, said at the conference that a 50-50 balance between optional and specific standards will evolve. "Standards will lean toward deregulation," he said, with specific technical standards only implemented for such things as network interconnects.

Another conference delegate, Bill Burgess, a Bank of America vice-president, said the bank prefers a structured approach to standards in order to develop orderly and predictable worldwide markets. The Bank of America does business in 90 countries, Burgess said, and "networking standards are necessary" — either IBM's or those of another system.

Besides the ISO's Open Service Interconnect Architecture, other proposed standards are the X.21 and its X.25 superset (supported by AT&T and Xerox Corp.) and IBM's SNA, which was approved in 1981 by the Consultative Committee on International Telephone and Telegraph, a Geneva-based organization that regulates technical standards. IBM's SNA is generally accepted as a de facto working standard in both the U.S. and Europe.

Brian Jefferey, research director of International Technology Group, a market research firm based in Palo Alto, Calif., said IBM's SNA was recently approved as a standard by Japan's central telecommunications agency, Nippon Telegraph and Telephone Public Corp., and Britain's British Telecom International with more support expected from European postal, telephone and telegraph authorities.

"The ISO standard is an abstraction. The entire issue is stalled because there's no end-user demand, and vendors aren't paying attention to the ISO standards question either," claimed Jefferey.

SNA and X.25 are not mutually exclusive, Jefferey said, because X.25 is stronger in remote, low-volume network transmissions, while SNA supports high-volume traffic.

According to Jefferey, the only end-user attempt to use an ISO-regulated standard was made by the Seattle First National Bank.

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Rapid global growth seen for telecommunications

By Kathleen Burton
CW West Coast Bureau

SAN FRANCISCO — Explosive worldwide growth is predicted through the decade for the burgeoning computer/telecommunications market if Europe and the U.S. put aside national differences and work together, said government officials and business leaders at two back-to-back strategy sessions on global market business opportunities at the World Communications Conference '84 (Worldcom '84) held here recently.

Carin Christian, president of the International Council for Planning, a Worldcom '84 sponsor, said the convergence of computers and telecommunications has spawned new applications for a glutted U.S. computer hardware and software industry, which can absorb a limited number of computers into domestic markets.

"The entire world is now a potential market," she said, and computers joined with telecommunications can help bring underdeveloped countries into the 21st century.

Citing AT&T's recent joint ventures with Holland's Philips Information Systems, Inc. and Italy's Olivetti Corp., Daniel Orlhac, vice-president of Consultronics in Paris, discussed the recent trend of European and U.S. multinationals to form joint ventures to bring new technologies like fiber optics into the commercial market. Such ventures shore up Europe's weaknesses in the areas of research and development, limited domestic markets and fragmented industries, Orlhac said.

European multinational companies are just beginning to take advantage of the deregulation of telecommunications in the U.S. and hope to speed up concurrent telecommunications liberalization in Europe, according to Orlhac.

"Europe is a gold mine, but we have to change the shovel we've been using," said Rui Lopes, a telecommunications consultant to the Bank of America in San Francisco.

Lopes agreed Europe and the U.S. need to form joint ventures to tackle successfully the large international export market. "If we don't form joint ventures in Western Europe, national security issues will prohibit effective technology exchange."

Different motives

According to Lopes, the move to deregulate telecommunications in Europe is based on different motives from those in the U.S. With only 2% of its economy based on exports, the U.S.' open competition has forced deregulation, while European countries are more interested in controlled deregulation.

"The limited size of the European market causes enormous problems for France," said Able Farnoux, president of the French Electronics and Telecommunications Council in Paris. According to Farnoux, France is the fourth largest producer of DP, office automation and communications equipment in the world, but claims only $18 billion, or 5%, of the worldwide market in these areas while carrying a $300 million export deficit.

Farnoux said IBM is a much greater threat to the French telecommunications industry in traffic, equipment, data and voice exchange than is AT&T. Farnoux claimed that 58% of France's DP equipment is either exported by the U.S. or produced in France by U.S. firms and that approximately 48% of that figure is manufactured by IBM.

Pacific rim nations are all developing according to widely separate agendas, said seminar speaker William Nusbaum, a corporate strategy planner at Pacific Telesis International. Nusbaum said there is a trend toward national privatism of telecommunications resources in Singapore and Thailand, for example, yet at the same time, Malaysia is trying to sell 60% of its telecommunications services to create entrepreneurial opportunities for the Malay people.

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Study predicts links to cause repercussions through DP

MOUNTAIN VIEW, Calif. — The impending linkage of microcomputers and mainframes will radically alter the nature of information management systems and the relationship between DP and end users in the next five years. It could also cause chaos for DP planners unprepared for the changes ahead.

Those ominous predictions are the core of a study released recently by the market research firm Input, Inc., based here, on the rapidly developing micro-mainframe link phenomenon.

The study, titled "End-User Micro-Mainframe Needs," was undertaken in early 1984, and its findings were based on structured interviews with DP professionals and end users in 78 Fortune 500 corporations and on a survey of market intentions conducted among 40 link product vendors. Approximately 95% of the corporations surveyed employed some type of micro-mainframe link, although not all were commercial products.

At the outset, the report stated that most DP managers surveyed agreed that their responses to the recent influx of corporate micros were reactionary and had little impact on either "the extent or the amount" of end-user micro use. More importantly, the report warned, "History may be about to repeat itself with regard to micro-mainframe linkage. However, there are much greater dangers from missteps in handling micro-mainframe issues, largely because end users and [DP] must work well and closely together if micro-mainframe efforts are to be successful."

'History may be about to repeat itself with regard to micro-mainframe linkage. However, there are much greater dangers from missteps in handling micro-mainframe issues, largely because end users and [DP] must work well and closely together if micro-mainframe efforts are to be successful.'

— "End-User Micro-Mainframe Needs."

As they did with micros, the DP departments studied by Input appear to be looking at micro-mainframe linkage in terms of maintaining control — restricting access so end users will not disrupt operational systems. In this scenario, data flows downward from file extracts for end-user analysis. "There is much to be said for this viewpoint," the report stated, "since this is the sort of activity that current vendor products are supporting."

But Input's researchers found that end users are looking for a great deal more — linkage that facilitates two-way data flow. "Not surprisingly," the study cited, "...users will increasingly be viewing operational and analytic use interchangeably."

The report stated that 85% of respondents are looking for links that offer "shared functionality," a term that describes micro-mainframe applications in which a DP activity cannot be carried out without processing and/or data being shared by both machines. "Even more important is the fact that three-quarters of respondents see most applications that are now host-based as having this kind of shared functionality in three to five years," the study said.

Input said that shared functionality "promises revolutionary changes for computer systems and their implementation." The company's own market analysis indicated that by 1988, between 20% and 35% of all installed mainframe applications will be micro-mainframe applications. That level of growth means that DP systems will look far different in five years and that planners will have to prepare their organizations for the great changes ahead (see story page 35). Those changes will affect the technical nature of systems, DP's internal organization and its relations with end users and possibly the way in which a firm conducts its business.

"There is a danger," the study said, "that the issues united under the banner of micro-mainframe could produce a discontinuity in data processing at least as large as that produced by the introduction of the [IBM] 360."

"After the 360 was introduced, everything about DP was different," said Thomas O'Flaherty, principal consultant with Input. "But that did not become apparent immediately, which is one of the key analogies here. The 360 changed the kinds of jobs DP professionals did. DP had limited horizons; it was a tiny world unto itself. But the 360 offered a range of power and potential that was undreamed of, and it took people years to realize that. We are going to see the same thing with micro-mainframe links. They will change the architecture of DP."

According to O'Flaherty, the successful migration to the shared functionality of micro-mainframe applications will require centralized planning and control. That control may be difficult to impose and enforce if an atmosphere of trust and understanding does not exist between end users and DP.

"End users believe that if they have a micro-based system in their department, they can do whatever they want with it. [In a link environment], that will create chaos in either desired or established central systems," he said. "On the other hand, if the micro just becomes an extension of the central system, you have traded more cost and complexity for no more local control. You have the potential for everybody to be unhappy."

"End-User Micro-Mainframe Needs" can be obtained free of charge from Input, 1943 Landings Drive, Mountain View, Calif. 94043.

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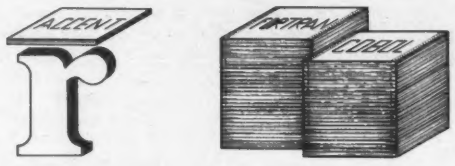
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Micro-CPU link tends to stifle micro flexibility: study

Can a microcomputer-to-mainframe link actually cause the micro to lose the flexibility that end users cherish? Yes, according to Input, Inc.'s recent study, "End-User Micro-Mainframe Needs."

"Micro systems are noted for their flexibility," the report states. "But by becoming connected to host-based systems, they must give up at least part of this flexibility. . . . In a micro-mainframe application, neither the end user nor [DP] will have sole control. This can be disastrous where the two groups have different priorities or have not learned how to work together."

According to Thomas O'Flaherty, principal consultant for Input, micros enabled end users to define data in ways that met their unique personal or departmental needs. But that data individuality may spawn difficulties in the shared functionality of the micro-mainframe environment.

"From the standpoint of each of the different departments running these micro-mainframe applications, those data changes are fine," he said. "But they can cause real problems for the people trying to run the centralized components of a system now based on data that has been massaged at the local level. This is not a problem that stems from micros and mainframes themselves, but it is due to the fact that processing can take place in different areas under different controls."

According to O'Flaherty, the solution is centralized planning and control over shared micro-mainframe applications. "Unfortunately," he said, "the expectations of the users will not be sympathetic to that planning and control. End users see planning as equaling time wasting, and they see control getting in the way of performing their important tasks."

Mutual trust helps avoid link ills

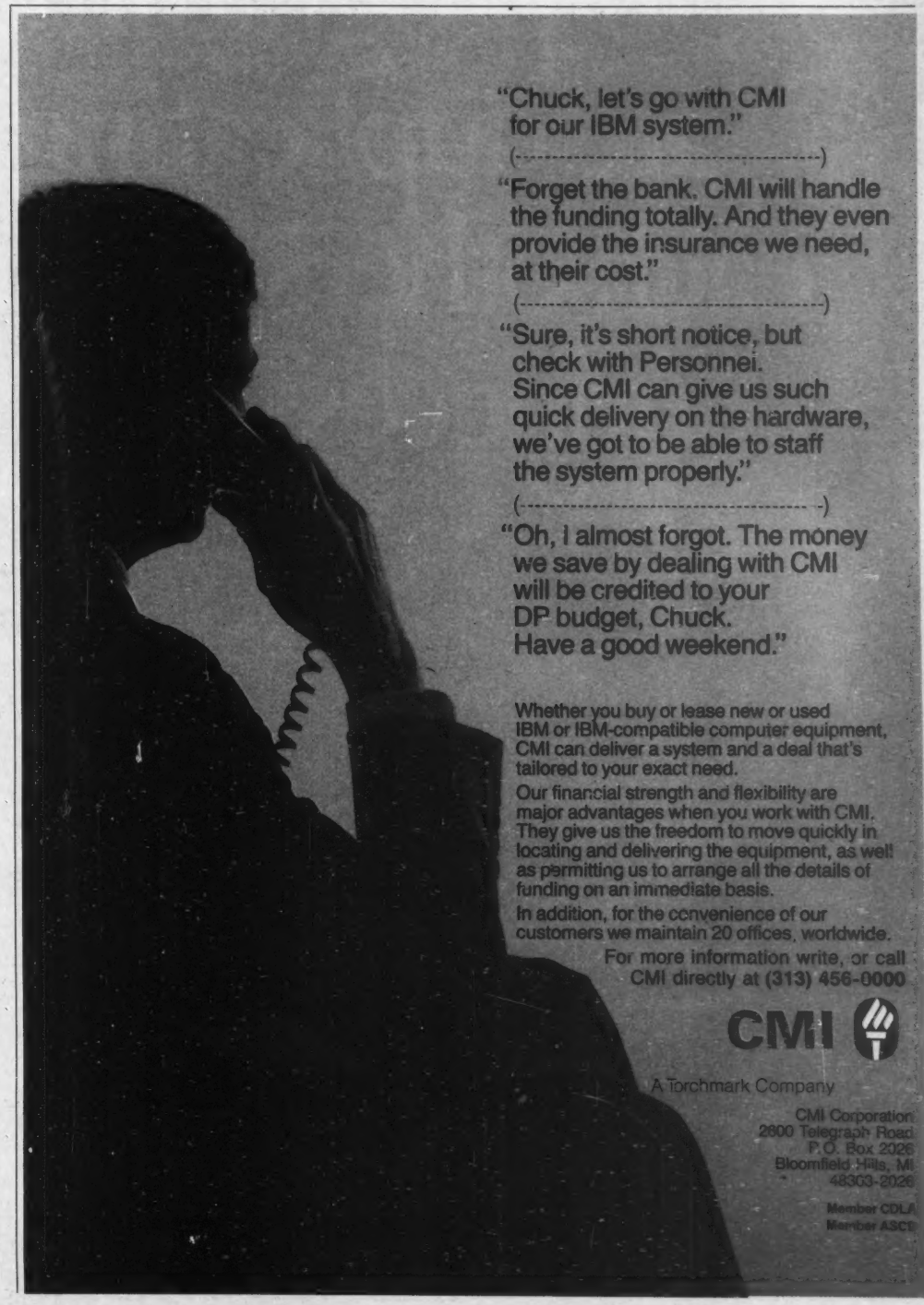
Input, Inc.'s study "End-User Micro-Mainframe Needs" states that the linking of microcomputers and mainframes will "accelerate the decentralization of applications-oriented functions to [end-user] departments." If not carefully planned, the report predicted, that decentralization could have negative effects on both "organizational and applications effectiveness."

But how should DP plan for the implementation of microcomputer-mainframe links? "I think the main thing to prevent many of the problems that may arise — the foundation requirement — is not a technical thing," said Input principal consultant Thomas O'Flaherty. "The basic requirement is that end users trust the DP department and that DP understand the users' needs. There are a great number of DP departments in big corporations where those two factors do not exist."

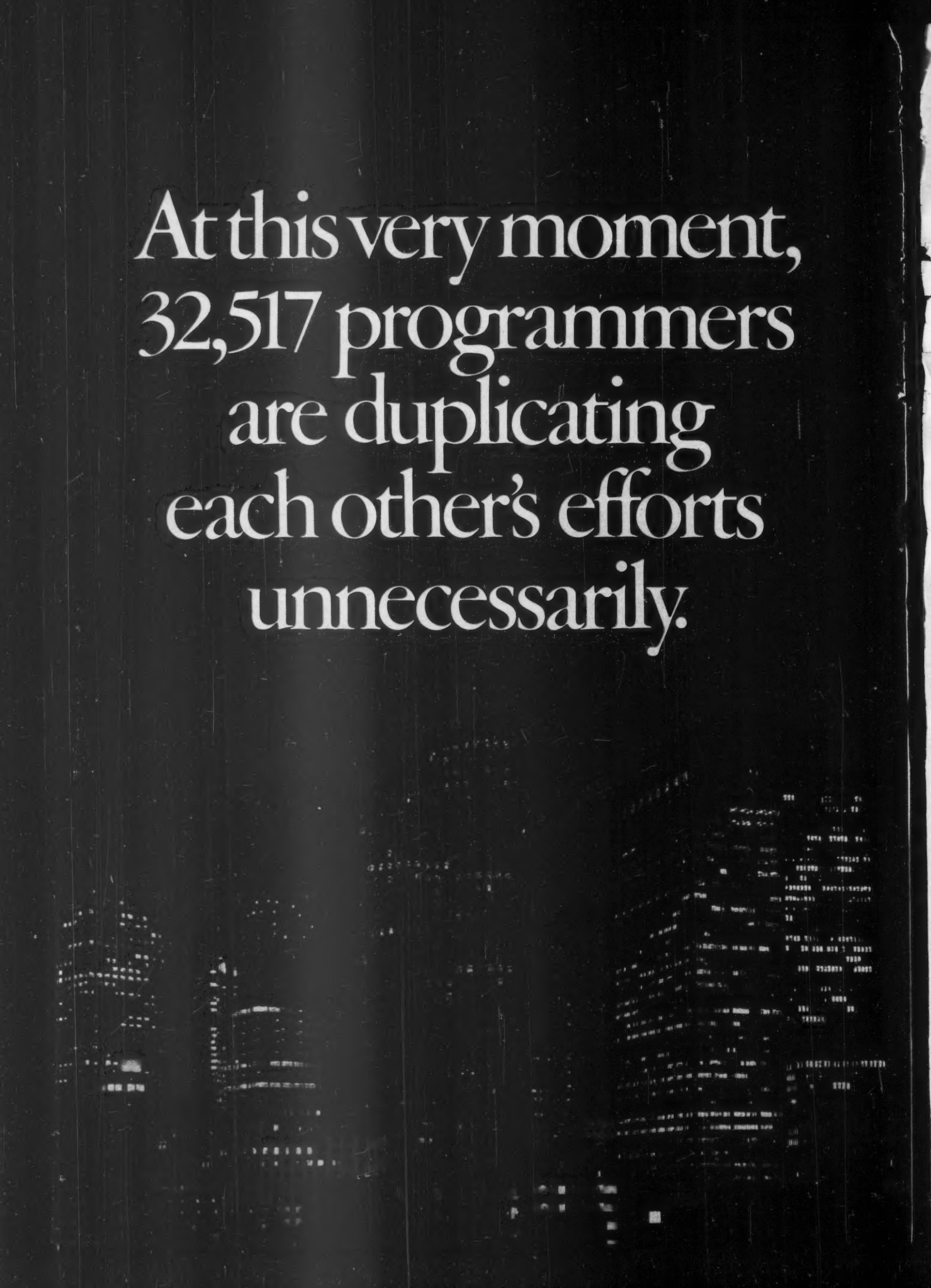
In planning for linkage, the study also recommended that:

- End users be educated on data processing technology and issues.
- DP take steps to gain a better understanding of the corporation's and individual department's business goals, motivations and problems.
- DP initiate low-risk micro-mainframe projects as learning tools and confidence builders.
- DP enter into informal arrangements with one or more link vendors to find technical solutions to micro-mainframe issues.

"This new micro-mainframe environment will happen," according to O'Flaherty, "and it may not happen easily, comfortably or correctly. But it is going to be the key technological direction for the rest of the 1980s and well into the 1990s. DP will really have to take a step back and see where it makes sense to place these [link] functions."

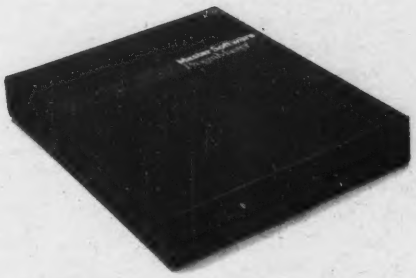


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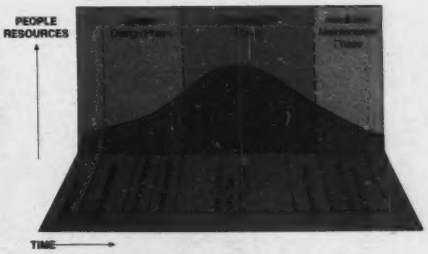
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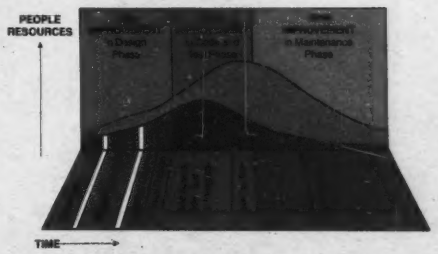
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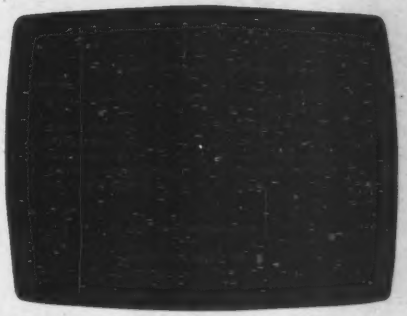
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NEWS

Detection system helps BLM monitor lightning strikes

By Maura McEnaney
CW Staff

BOISE, Idaho — If lightning ever strikes twice, the U.S. Bureau of Land Management (BLM) is likely to know it.

For about eight years, the government agency that oversees approximately 175 million acres of government-owned land in 11 western states has been monitoring lightning strikes through a computer system based here.



Since 1976, the BLM has been using the Automatic Lightning Detection System (Alds) to help about 55 BLM district offices pinpoint lightning strikes and possible range fires.

By next month, however, Alds will be part of a $7 million program that will provide BLM fire managers with specific information on the probabilities and behaviors of fires in their areas.

The current lightning detection program monitors the cloud-to-ground lightning bolts that provide a negative charge, according to Dan Aulback, lead technician in BLM's lightning division. Using 32 direction finders — sensors that operate on a radio frequency band — lightning frequencies are examined through a wide open receiver and filtered through an analog-to-digital converter. The BLM is then able to detect and identify the more frequent negatively charged lightning bolts (the least likely to cause fires).

Once it has been determined there has been an actual strike, the bolt's latitudinal and longitudinal location is computed, and the information is communicated to Data General Corp. Model 20 desktop computers in approximately 22 district offices in the 11-state area, all within a matter of seconds. Anadex, Inc. DP 9501 Silent/Scribe printers used with the Model 20 then print out a map with an "X" marking the location of the lightning strike.

Although the system is currently designed to detect the kind of lightning bolts that are least likely to start fires, area fire managers believe it is effective. "We know for a fact that we are detecting fires," Aulback said. "We had people out in the field who saw a lightning strike, called it in, and by the time we received the call, it had started a fire."

Alds has not actually prevented any fires or saved on fire costs, but area managers say they recognize other advantages. Donald Doyen, area fire manager at the BLM in Phoenix, said Alds saves money for his office in aerial observation costs. If it appears as though one area has been hard hit with lightning strikes, Doyen said his office can direct a plane to a specific area, instead of scanning land masses.

Not without problems

But Alds as it now exists is not without problems. In the Phoenix office, for example, a bug in the system caused it to light up the office screen recording 39,000 lightning strikes at the same time. "We're still adjusting as things happen," Doyen said.

With the implementation of the new detection system, area fire managers can expect even more help with fire information. According to program manager Stephen German, the Inital Attack Management System (IAMS), phase one of which is expected to be implemented by the end of this month, will use Alds to process information about fires given lightning strikes, weather conditions and ground vegetation.

More than 600 automated weather stations operated by the BLM and other government agencies, such as the U.S. Forest Service, will be installed throughout the West and connnected to IAMS. These systems will use a satellite down-link to communicate information to the mainframe here on wind speed and direction, area vegetation and precipitation conditions.

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NEWS

Murphy's law: Work for success

State secretary tells women to seek realistic goals

By Donna Raimondi
CW Staff

NEWTON, Mass. — Women in information processing who want to get ahead in the '80s had better be prepared for long hours and hard work and must develop realistic expectations of what it takes to reach the top. So said the Massachusetts Secretary of Economic Affairs Dr. Evelyn Murphy in a recent address to the Women in Information Processing at the Boston Forum here.

Support for women to rise into positions of power is stronger now than it has ever been, but women must "grab [the power], take it, exercise the amount of risk you feel you can," Murphy said.

Education important

Education is important, and achieving that education means deferring material comforts in order to pay for it, Murphy noted. A Ph.D. may not be necessary for success, but it gives a woman credibility and sets her apart from others, she said. That education also provides a fallback necessary for anyone who decides to take risks. Women who ride a narrow upward track to success could be devastated by failure, so they must plan other sidetracks to their goals.

Trade-offs are real, Murphy said. An MIT study of successful women showed that they have come close to parity with men in salaries, but that they have had to suspend life decisions, such as having children, in order to achieve this, she said.

Hard work is the key to success, Murphy asserted. She has worked 80 to 100 hours a week for 20 years to reach her goals and will not hire anyone who insists on a 40-hour work week.

Opportunities are often greater for people over 40 years of age, because they have a financial base to use in negotiating risks. Murphy, for example, said she sold her home to finance an unsuccessful bid for the lieutenant governor position in Massachusetts. "I gambled and lost, but I could afford to gamble; I could afford to risk," she said.

Networks for women in information processing and other professions are valuable supports, Murphy noted, but the often-expressed hope that they will help career advancement is not realistic. Women should look to these groups as sources to learn about what other women are doing to reach their goals and why they are doing it.

In her experiences as a speaker and as a participant in networking groups, Murphy has found that women under 40 years of age constitute about two-thirds of the groups. These women are more serious and more realistic about what they have to do to reach the top, she said.

Women in technical fields should also become politically active, Murphy said. No matter how much effort an individual woman puts forth to "make it," a political climate of equality must exist.

"Choose a candidate you believe in and work for him or her," she advised. "Lick stamps or do errands, but do something to help the political climate that in turn helps women succeed."

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Universities promoting micro use in MBA curriculum

By Edward Warner
CW Staff

The nation's future MBA graduates returned to school this month, many of them fresh from summer internships in which the personal computer played an important role.

On campus, they will find an increasing emphasis on the personal computer, ranging from the establishment or expansion of personal computer laboratories to, at one school, the outright requirement that all first-year MBA students use IBM Personal Computers or compatibles for coursework.

Among those graduate business schools that have expanded their personal computer programs are:

■ Carnegie-Mellon University's Graduate School of Industrial Administration, where all students have lost their general-user accounts on the school's mainframe and are being asked to use personal computers instead for homework. By 1986, all Carnegie-Mellon students will be required to own personal computers.

■ The University of Michigan Graduate School of Business, where a $6 million Burroughs Corp. donation of hardware, software and services has helped establish a business school computer center, to be opened Oct. 12. The donation includes 342 Burroughs B-25 micros and three Burroughs XE5 supermicros, most of them for use by students in computer labs.

■ Rutgers University's Graduate School of Management, where a lab with 15 to 17 IBM Personal Computers has been established as part of what a spokeswoman said was the school's goal to see "the micro become a part of every course here."

■ The Wharton School of the University of Pennsylvania, where a newly revised 10-week course in personal computing is being offered along with a continuing series of software seminars.

The surge in personal computer emphasis in business schools mirrors that shown over the last several years by corporate America. In 1983, approximately 800,000 personal computers were in use by 5% to 6% of office workers in Fortune 2000 firms.

Computer required at Harvard

What is likely the greatest step toward emphasizing the personal computer in the MBA curriculum, however, is that of Harvard University's Graduate School of Business Administration. First-year students there are required this year to use IBM Personal Computers or compatibles for their homework. Those who do not already own a Personal Computer can buy one from the university at a discount.

The surge in personal computer emphasis in the halls of business schools mirrors that shown over the last several years by corporate America. In 1983, according to research by Future Computing, Inc., a Richardson, Texas, consulting firm, approximately 800,000 personal computers were in use by 5% to 6% of office workers in Fortune 2000 firms.

By 1990, the firm predicts, Fortune 2000 firms will have eight to 10 million personal computers in use by almost half of all office workers.

"Business leaders of the late 20th century will have to be computer compatible," stated Anthony M. Santomero, vice-dean and director of the Wharton School's graduate division. To train those future chief executive officers and division managers, the Wharton School set up six computer labs, each having 25 personal computers and open 24 hours a day. Four labs use the Digital Equipment Corp. Rainbow personal computer, one uses the Apple Computer, Inc. Macintosh and the sixth uses the Hewlett-Packard Co. HP 150.

Wharton Deputy Dean Bill Pierskalla predicted that the microcomputer will become "as necessary as the calculator" for an MBA student, especially for word processing and spreadsheeting. So far, though, only about 10% of entering Wharton School students arrive with personal computers, reported David Cossey, the school's director of computing and instructional technology.

Cossey said discussions are under way at the school to make personal computer ownership a requirement.

That was the path chosen by Harvard's business school when it announced in February that this fall's crop of roughly 780 new MBA students would be required to own Personal Computers or compatibles. Should a student not already own a Personal Computer, the school is providing him with computer, software, a modem and a printer — at a cost of $3,350.

Approximately one-fourth of those students' first-year classes will require computers for the completion of homework, which they will upload via modem to an IBM 4361 mainframe. The computers will not be used in the classroom, however.

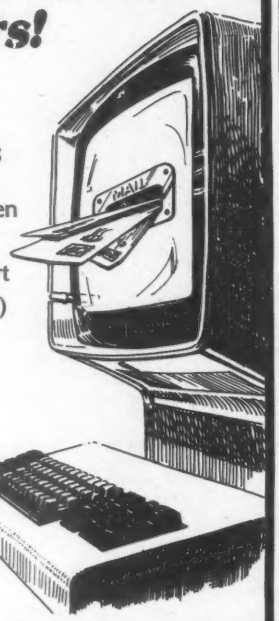
One reason why the Personal Computer was chosen, a Harvard spokesman said, was that it has become an industry standard, and the business

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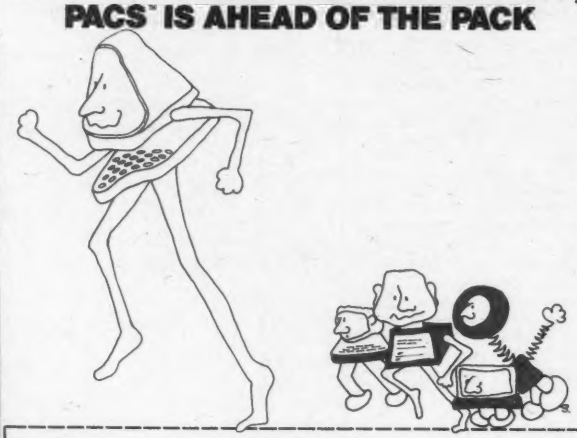
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Corporate internships stress micro use

By Edward Warner
CW Staff

PITTSBURGH — Before he began his summer internship at Westinghouse Electric Corp.'s Productivity and Quality Center here, Dan Stoyak was pretty much of a computer novice.

By the end of the summer, though, Stoyak, a student in the Carnegie-Mellon University Graduate School of Industrial Administration, had developed a personal computer program to measure and store employee productivity ratings.

Stoyak's story is not uncommon among the ranks of the nation's second-year MBA students, who are returning to the campus after summer internships at corporations that increasingly emphasize the personal computer.

According to one of Stoyak's professors, Ilker Baybars, codirector of the Carnegie-Mellon industrial administration graduate program, as many as 80% of students who had summer jobs this year have had to work with personal computers.

One such student was Gary Grossman of the University of Michigan's Graduate School of Business Administration, who said he used personal computers "quite a bit" in his summer job as a strategic planner with the Pratt & Whitney Aircraft Manufacturing Division of United Technologies Corp.

Another Carnegie-Mellon student, Lisa Packer, said she used a personal computer to help develop a system that updated cost accounting for internal funds transfers at her employer, Chemical Bank of New York.

What do the students think of the personal computer education taking place in their MBA programs? Grossman said he has found demand intense for the eight Burroughs Corp. B20 micros and three IBM Personal Computer XT units in use during spring term at the University of Michigan graduate school of business' computer lab. Those machines, he said, were "used day in and day out. Demand was just amazing."

Packer, meanwhile, said she was no stranger to using an electronic spreadsheet while working at Chemical Bank this summer because she had used Lotus Development Corp.'s 1-2-3 package for business case analysis.

SCHOOL from page 40

school wants to produce a line of courseware, or educational software, and market it to other schools as it now markets its business case studies.

The need for courseware is a concern at several of the graduate business schools undergoing expansion of their computer programs. Most schools said Lotus Development Corp.'s 1-2-3 integrated package, a word-processing program and a statistical program are being used, but that faculty had not yet gained enough expertise with computers to begin to write their own courseware. Another problem was a shortage of personal computers for the number of students, the schools reported.

At Rutgers' Graduate School of Management, manager of external relations Liz Cohen reported that the 15 to 17 Personal Computers in the school's new computer lab would serve a student body of 1,500, a ratio of about 100 to each computer.

Moving experience downs system, delays families' food stamps

By David Olmos
CW Staff

AUSTIN, Texas — When the Texas Department of Human Resources' computers here went on the blink after a major relocation, some 4,000 food stamp recipients were left wondering where their next meal would come from.

Last month, the department moved its Sperry Corp. 1100/82 and 1100/70 mainframes to another location in Austin as part of a long-planned effort to streamline the department and centralize operations, including the data processing center.

When DP staff members tried to bring the systems up, however, they met with a number of malfunctions.

John White, administrator for data processing operations in Austin, attributed most of the system problems to the jostling of 150 disk drives and 30 tape drives during the moving operation. In one instance, a truck transporting the memory devices jumped a curb when its tire blew out.

Telephone line problems on equipment operated by Southwestern Bell Corp. also hampered the relocation effort. White said this affected communications between the host computers in Austin and the Sperry UTS 40 and UTS 20 terminals used for remote data entry in Houston.

Despite all the problems, White said, the system was down just three working days. He said he considered that an accomplishment because earlier estimates had called for the system to be down three weeks.

Nevertheless, the downtime did result in the department's Houston regional office, which services a 13-county area, falling behind in its work.

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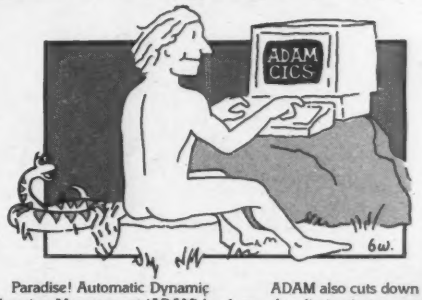
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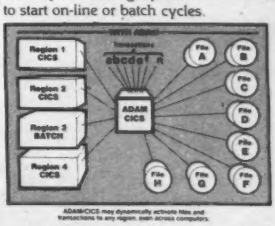
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Swedish banks adopt magnetic cards to secure ATMs

STOCKHOLM — Sweden was long concerned about its pregnable network of automated teller machines (ATM). Last spring, after a few years of research and experimentation, the banking community officially adopted a magnetic security technology to safeguard all transaction banking cards issued in the country.

According to Svante Brage, manager of Bankomat Centralen, which develops and manages all ATMs in Sweden, an exhaustive search preceded the selection of the Watermark Magnetics magnetic tape from Thorn EMI Malco, Inc. of Owings Mills, Md. (Thorn Melco is the U.S. division of Thorn EMI Information Technology Group of the UK.)

"Its permanent structured encoding proves to be highly secure," Brage noted. "Also, it is compatible with standard magnetic stripe cards and ATM hardware already [installed out] in the field."

Watermark Magnetics has been permanently encoded during the tape manufacturing process. This permanent code is unlike the coding on existing bank and credit cards, which can be altered, copied or even erased if exposed to magnetic force. The encoded Watermark Magnetics' number is unalterably structured into the wet magnetic tape material.

Once dried, this unique number can be read electronically and used as a permanent foundation for uniquely locking the standard encoding to the card and subsequently to the cardholder's personal identification number, according to a Thorn Melco spokesman. The encoded number is unknown to the user, and the process is totally transparent, he added.

Brage said once the decision was made to go with Watermark Magnetics, the implementation could take place immediately because needed system components, such as tape, chips and read heads, were relatively inexpensive and readily available from a variety of licensed European card and hardware vendors. "Watermark Magnetics was a cost-effective solution to the problems of card counterfeiting and magnetic data alteration," Brage said.

Several million Watermark Magnetics plastic bank cards with standard magnetic encoding are already being used in Sweden, and, apparently, word is spreading. During the coming months, Chubb Information Systems Ltd. of the UK plans to begin retrofitting its 550 ATM systems with Watermark Magnetics reading hardware.

The conversion process of the reader heads costs around $25, according to a spokesman for Bankomat Centralen. Thereafter, all new ATMs will include the Watermark Magnetics security components to read and verify the security encoding permanently built into the stripe.



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IBM in Europe: delivery delays, bold marketing

By Luc Sala
Special to CW†

AMSTERDAM — On Sept. 10 IBM unveiled its Personal Computer AT in the Netherlands and in other European countries as well. IBM also introduced a number of other hardware and software products previously heralded in the U.S., such as the cluster network setup and the PC/IX operating system.

The time lapse between the U.S. product announcements and the European introductions — in the case of the Personal Computer, more than a year had transpired, while the PCjr never even made the Atlantic crossing — makes one wonder about IBM's strategy.

At the same time, software translation to local languages had been completed, which usually indicates the availability of the products to a specific country. (This kind of work cannot be done in a month, which partially accounts for the delays.)

More interesting than the time intervals is IBM's pricing policy. Even with the high U.S. dollar, IBM came to Europe with a very low price: $3,750 for the basic AT unit. This price is the same or slightly lower than the U.S. price, despite the fact that a 6% tariff exists on imports.

Meanwhile, IBM lowered the price of the Personal Computer XT by 20% to 25%, making the machine the hard-disk bargain on the market. Compaq Computer Corp. and others will undoubtedly suffer.

IBM has gone in for aggressive marketing practices in Europe recently. From the customer's point of view, these actions appear to have been prompted by slow summer Personal Computer sales. Meanwhile, confusion about future developments, which IBM is certainly stimulating, makes customers who are out shopping opt for either the rock-bottom prices of Sanyo Business Systems Corp. and other cheap MS-DOS compatibles, or go for IBM.

Luc Sala is the editor of a European micro newsletter and a frequent contributor to Computerworld.

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AUSTRALIA

BLACKBURN — The computer systems division of Hewlett-Packard Australia, Ltd. will exceed a 50% growth rate in the fiscal year ending Oct. 31, sources here said. The company, whose overall growth rate is estimated to be 40% higher than last year's, declined comment as to what its actual corporate revenues were.

CHINA

BEIJING — The recently held 1984 National Computer and Application Show here showcased the latest achievements of China's computer industry. Of the 200 exhibits, nearly half of the products on display were microcomputers and microbased application packages. The Great Wall 100, from Beijing Telecommunications, for example, was pitted against the IBM Personal Computer XT.

Also of note at the show was the Holograph Microfiling system, developed by the Tianjin Computer Research Institute. This product included a laser microfilm recorder and computerized microfilm retriever and reportedly can store up to 12,040 pages of text on a 6-in. by 4-in. holograph microfilm.

■

BEIJING — Qinhua University has unveiled its local-area network for microcomputers, which is thought to be China's first local-area network to be produced by local manufacturers.

The network features a built-in common Chinese character library and supports electronic mail in Chinese characters between nodes. It features a bus topology, twisted-pair cables, baseband transmission, a maximum data rate of 1M bit/sec and a maximum range of 1.2 km, sources said. It can support up to 64 nodes and is compatible with a wide range of personal computers, including the IBM Personal Computer and compatibles, Apple Computer, Inc.'s Apple II and compatibles and the NEC Corp. PC 8000 system.

FRANCE

PARIS — The Telebank project, an implementation of a national electronic payment system using smartcards with embedded microprocessors is now entering its initial phase here. During the start-up phase, some 7,500 card holders will be able to conduct business at public terminals in shops and banks. By 1985, the Telebank experiment will be extended to include remote payment using the card on home terminals.

The Telebank project was spearheaded by the French Telecommunications Authorities, a consortium of French banks and Honeywell-CII Bull. The French software house Sligos is supplying the central remote reporting software for the payment system, sources said.

JAPAN

TOKYO — Fujitsu, Ltd. has announced plans to build two manufacturing facilities for disk storage and integrated circuits in the U.S. They will be located in suburban Portland, Ore.

By 1987, these manufacturing facilities reportedly will be mass-producing IBM-competitive hard-disk storage devices and 256K-byte chips.

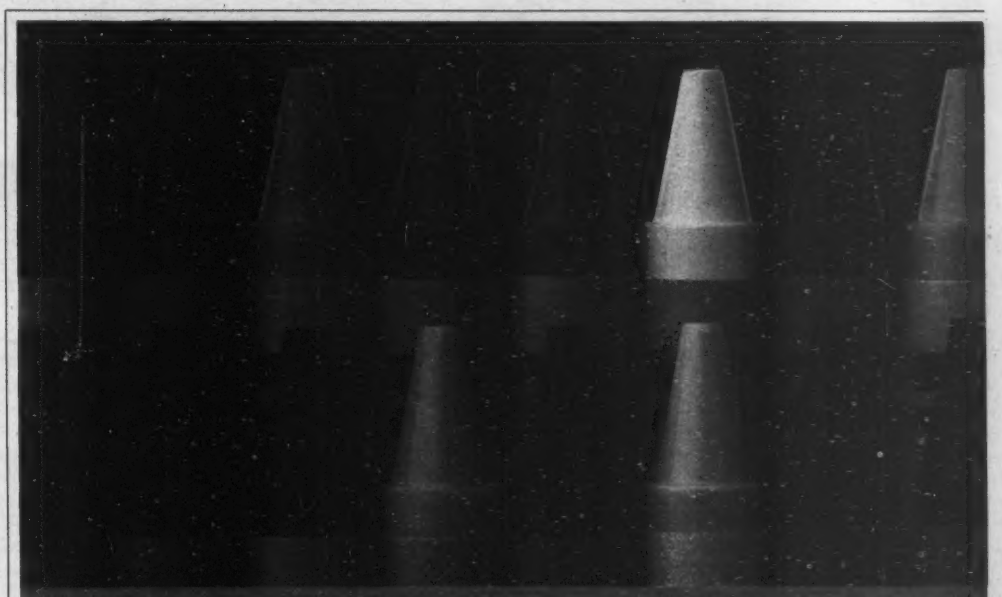
NORWAY

OSLO — Cap Gemini Sogeti, a French software company, and Tandem Computers, Inc., a U.S. computer manufacturer, have been awarded a $12 million contract to design and install a public videotex system in Norway.

The contract was awarded by the Norwegian Postal, Telephone and Telegraph Agency.

SWITZERLAND

BERN — Wang Laboratories, Inc. has recently completed the sale of $81 million worth of covertible subordinated bonds, due in 1999, in Switzerland. The bonds are worth approximately $37 per share. A syndicate of Swiss banks, led by First Chicago S.A., underwrote the issue. The proceeds from the stock sale will be used to repay short-term debts.



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Package makes CICS programming a snap at utility

HUNTSVILLE, Ala. — After an unsuccessful, 18-month search for a command-level programmer for IBM CICS, any data processing manager would be frustrated, and Connell Taylor was no exception.

The DP supervisor for Huntsville Utilities, Taylor reviewed more than three hundred applications for the programming slot in his 10-member department without filling the position. "Ninety percent of the respondents were totally unqualified to meet the requirements," Taylor recalled. The remaining 10% were qualified in varying degrees, but were consistently too expensive, given the utility's budgetary constraints, he said.

Taylor's need for an additional programmer was in anticipation of heavy on-line systems development. The utility's DP department also saw an increase in the demand for management reports and other special applications.

Huntsville Utilities provides seven services to its 85,000 customers: water, gas, electricity, sewer, garbage, outdoor lighting and fire protection. They use an IBM 370/158 running under DOS/VS to manage their customer data base as well as provide services to departments within the utility itself.

By the beginning of 1984, the DP department had all but abandoned its position description in favor of hiring an experienced Cobol programmer with batch skills and providing the CICS training in-house or through an outside training program.

It was around that time that Taylor read about Oxford Software Corp.'s UFO/Cobol, an application development system that allows programmers to write on-line applications in standard Cobol without having to learn complex command-level or macro-level CICS code.

Taylor decided to try UFO/Cobol on a test basis in March 1984 amid some staff skepticism over whether it would really meet the department's needs. The skeptics were converted in three days by Sandra Montgomery, a University of Alabama cooperative work/study student studying MIS, who had never written a CICS program. Montgomery was given about an hour of instruction on the product and then wrote an inquiry program in a day.

Because of the operating system the computer now uses, some problems have arisen. Taylor has difficulty linking programs, and the COPY statement does not work in UFO/Cobol, he said. He also said that the utility is in the process of installing the VSE operating system, a move that should eliminate both issues.

Since installing UFO/Cobol, the utility has hired two additional programmers, both of whom, according to Taylor, were able to pick up on the language and complete several on-line applications with few problems.

Once systems analysts and programmers start benefiting from the increased ease of development, they generally stop perceiving productivity aids as a threat, Taylor said. "Knowing CICS makes you appreciate UFO/Cobol even more," he concluded.

The Huntsville Utilities' DP staff cited the screen-painting facility of UFO/Cobol as one improvement over using CICS. The facility allows programmers to build or modify screens by positioning fields without writing any code. The staff also noted that, unlike CICS macro- and command-level programs, UFO/Cobol is much less likely to bring the system down when a programming problem occurs. This reduces the need for a CICS test system.

After working with UFO/Cobol for a number of months and developing some sophisticated on-line applications, the DP department is rewriting existing CICS code to UFO/Cobol code.

Future plans call for the development of a complex work-order system that has been projected as a five-man-year project. All the on-line portions of the system are slated to be completed in UFO/Cobol.

Meet to focus on post-breakup era

FRAMINGHAM, Mass. — The array of options left to communications users after the AT&T divestiture is the subject of International Data Corp.'s (IDC) fall executive conference Oct. 21-24 at the Doral Country Club in Miami.

Richard E. Wiley, former chairman of the Federal Communications Commission, and Alan Pearce, president of Information Age Economics, Inc., a research firm in Bethesda, Md., will be among the speakers.

Other speakers include John Mullaney, executive vice-president of Intecom, Inc.; and Richard J. Myers, national sales manager of Lightnet, a venture of Southern New England Telephone Co. and CSX Industries.

Advanced registration is $695 before Sept. 24 and $795 thereafter. Registration for more than one attendee is $495 before Sept. 24 and $595 thereafter.

IDC is located at 5 Speen St., Framingham, Mass. 01701.

IRMA™ introduces a CICS file transfer system that will end PC-to-mainframe monkey business.



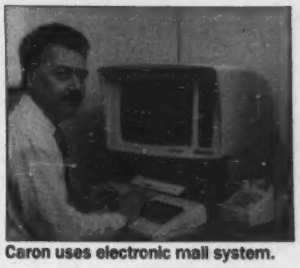
Firm adds electronic mail without additional hardware

SYRACUSE, N.Y. — A manufacturer of heating and cooling systems installed an electronic mail system to give its sales and service organizations access to each other and to headquarters. The company managed to achieve its goal of adding this capability without buying additional hardware.

Headquartered in Syracuse, Carrier Corp.'s operations are worldwide. G.W. Ted Caron is senior business analyst with Carrier Information Services here, the section that provides data processing services for the entire organization. Carrier decided whatever software was purchased would have to run on its mainframe with the existing operating system and network. The company particularly wanted to avoid a significant investment in a discrete processor for the electronic mail system.

After looking at several suppliers, Carrier executives selected National Business Systems, Inc.'s Total Office Support System (Toss), a software package that works with Carrier's existing IBM 3081 mainframe running under IBM's MVS/CICS and employs some of the spare capacity on its private-line data communications network.

The software provides five major functions: an electronic mail system, a meeting facility, a resource scheduling system, a task management system and a note processing facility.



Caron uses electronic mail system.

Toss currently processes 130,000 transactions a day and operates 21 hours a day, seven days a week.

A 90-day pilot program involved a variety of offices in the U.S. and Canada. It "stopped being a pilot after one month," Caron said, because the users were so happy with the system. In a little less than a year, Carrier managed to bring all of its 100 locations on-line.

In the two years that Carrier has had Toss, its users have seen enhancements such as a directory, support for a variety of devices and a batch interface. Carrier is now considering adding a spreadsheet capability.

There have been some problems, such as transactions sometimes causing abends, but the vendor's applications programmers have been able to fix them. The Carrier analyst elected to write his own user's manual because National's was geared to the DP professional, and it was difficult for the end user to follow.

Carrier's training and education group offers a four-hour Toss class. By the end of 1982, some 400 employees had used the system. Since then, 3,000 people have signed up with the full support of Carrier's top management.

Still another measure of the system's impact is the company's lowered telephone bills. Caron said, "In the service organization alone, the long-distance expense was down $160,000 for 1983." The system has "probably more than paid for itself in long-distance phone call reductions," he added.

Caron also said he has seen a host of intangible gains, such as the time saved in sending electronic messages instead of using the U.S. mail system.

Today at Carrier, meetings are scheduled, employees create their own tickler files, secretaries have less paper on their desks, engineers compare notes, and month-end closing figures are transmitted directly to Syracuse.

Caron found that employees are developing new ways to use the electronic mail system, such as sending messages to branch facilities to search for parts. Carrier's international offices use microcomputers and can now create their files off-line on a diskette, connect to Toss and transmit. "They are not tying that line up and paying a bundle for it."



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Data base program's popularity soars following debut

WASHINGTON, D.C. — The advertisement on television says "Be all you can be, in the Army" and shows the recruiting sergeant scrolling his way through a data base on a microcomputer screen in order to fit the recruit with an available job opening.

The data base management system is called Request, and it was created by System Automation Co. (SAC) of Silver Spring, Md. Since it became commercially available for microcomputer users last November, Request has been used in recruiting over $500,000 in sales, according to SAC President Alfred Rubin.

The key to the popularity of the program is its ease of use, Rubin said. After a one-hour training period, a Request user can be guided through the steps to run the program following the menus and prompt and error messages, which are given in English.

Word-of-mouth advertising has been responsible for most of the initial success of Request, although the scholarly, bespectacled Rubin was recently seen patrolling the boundaries of SAC's booth at the Government Computer Expo held here recently.

Early '70s

Request was initially developed in the early 1970s for mainframe data base programming. It was widely used in the Army and the airline industry before it was redesigned to function at the micro level. It is designed to run in a multivendor environment under the MS-DOS, PC-DOS and Ctos operating systems.

Request automatically converts mainframe data formats into Request data base formats and permits multiple access simultaneously for report generation. It can maintain directories of reports and forms created during system use.

At the Government Computer Expo an updated Version 3.0 of Request was shown which, among other things, can handle global updates, update selected fields without changing every record individually, perform searches on selected fields located on a record within a linked table, conduct faster searches and, with one keystroke, perform a list of Request instructions and make five new calculations in addition to other changes, according to Rubin.

Request is priced according to the hardware it runs on. For the IBM Personal Computer environment, the price is $695 per package. For the Convergent Technologies, Inc. workstation, NCR Corp., Gould, Inc., Prime Computer, Inc. and Raytheon Co., the cost is $1,500 per package.

SAC is located at 8555 Sixteenth St., Silver Spring, Md. 20910.

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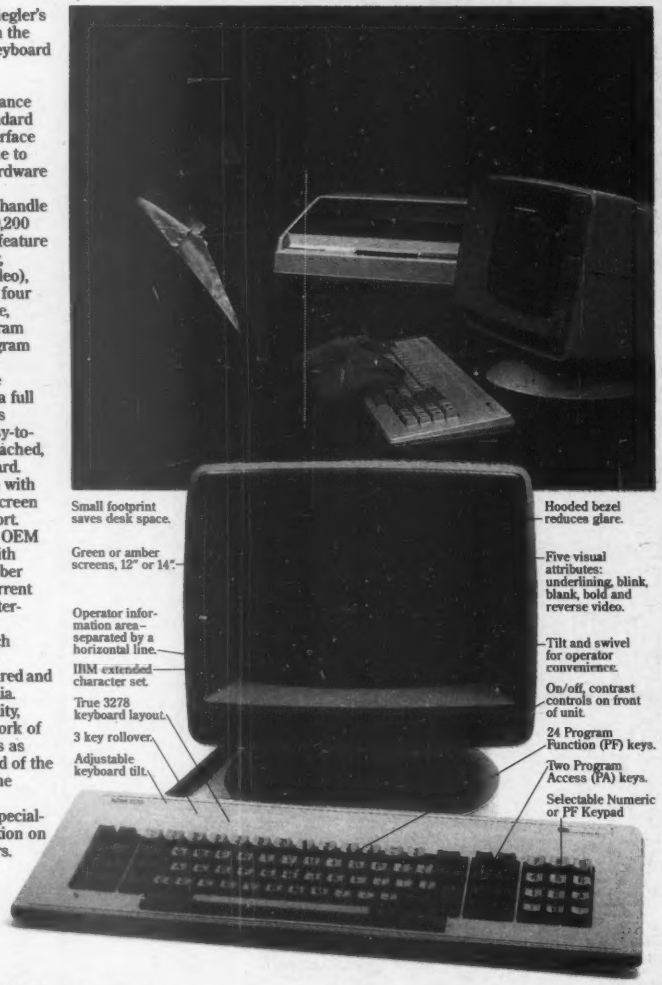
The ADM 1178 terminals can handle computer transmissions up to 19,200 baud without handshaking. They feature five video attributes (underlining, blink, blank, bold and reverse video), the IBM extended character set, four cursor modes (block or underline, blinking or steady), and 24 Program Function (PF) keys and two Program Access (PA) keys.

For operator convenience, the ADM 1178 terminals come with a full tilt and swivel monitor that stops positively in any position, an easy-to-read non-glare screen, and a detached, low-profile DIN standard keyboard.

The ADM 1178s are available with a standard 12" green or amber screen and an RS-232C serial printer port. They can be easily modified for OEM applications and are available with such options as 14" green or amber screen, answerback memory, current loop or RS-422 interface, and international character sets.

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Data Decisions survey views graphics tools

CHERRY HILL, N.J. — A survey of 60 graphics software packages for microcomputers was recently released by Data Decisions, Inc., publishers of monthly information on computer products.

According to company spokesmen, "Microcomputer Graphics Software" includes descriptions of information best suited for graphics presentations, as well as product descriptions and explanations of product features to look for and avoid.

Included in the introductory section is a reference chart that describes product operating systems and capabilities.

Product descriptions are arranged alphabetically according to vendor and include the date of product introduction, its applications, hardware and operating system requirements, display and output capabilities, text chart features, price and business or numeric graphics features, the spokesmen said.

The survey costs $29 and is available from Data Decisions, 20 Brace Road, Cherry Hill, N.J. 08034.

SMI seeking donated micros

CHICAGO — The Society for Information Management (SIM) is seeking donated microcomputers for use by native American students at schools on Indian reservations throughout the country.

First proposed a year ago, SIM's Computer Education Project is intended to advance computer literacy and education among native Americans, according to SIM President-Elect Carl C. Williams, senior vice-president and director of MIS for Doyle Dane Bernhach International in New York.

All equipment must be packed properly and shipped postage paid to the Society for Information Management, 111 E. Wacker Drive, Chicago, Ill. 60611.

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NEWS

Trailways boosts efficiency with customized system

By Donna Raimondi
CW Staff

DALLAS — Trailways Lines, Inc. faced increasingly stiff competition when the transportation business was deregulated by the federal government. Routes that Trailways had monopolized were opened up to other bus companies, and as competition increased, Trailways turned to increasing the efficiency of its operations in order to keep costs down.

Particularly affected was the Trailways Leisure Travel division, which handles the company's tour and charter business. It needed a system to handle price quoting, booking and dispatching, all of which were being done manually in four telemarketing centers across the country. It could not use the same computerized system that the rest of the company instituted because its group booking process is very different from the passenger booking process.

James Kerrigan Jr., director of marketing at Trailways Leisure Travel, said the company considered creating its own system, but after looking at what was involved, it decided to search for an outside company. Kerrigan found, after an initial perusal of existing systems for use by bus companies, that no one had ever written the kind of software needed for a company as large as Trailways. Several packages existed, but he said they were not adequate.

Michigan vendor

Executive Business Systems (EBS) of Flint, Mich., had a good system and applicable software, and it was willing to do the modifications needed, according to Kerrigan. The EBS system includes two Cado Systems Corp. Contel Cado Tiger ATS 64 1M-byte supermicrocomputers, 46 Cado C301 CRTs, Printronix, Inc. and Cado printers and software customized for Trailways by EBS.

Trailways has been using the system now for two months. Since its installation, the booking process, which used to take 15 to 20 minutes per transaction, is now accomplished in five minutes. A sales representative can handle four or five times as many customers as before. Three of the four telemarketing centers in the U.S. are being eliminated, with all the bookings going through the Dallas center. That has meant a reduction of 30 employees, and the savings in salaries and rent are projected to be in excess of $500,000 this year, according to Kerrigan.

Another benefit of the system is its accuracy. Kerrigan said errors have been markedly reduced. For example, sales representatives were apt to give customers different prices, depending upon who was called. Because the company must refer to rapidly changing price tables, all the representatives were not aware at all times of what the prices were. Before, the pricing tables were updated manually, photocopied and sent to the telemarketing centers. Now a simple update to the computer rate tables ensures that all sales personnel have the same information.

Needs improvements

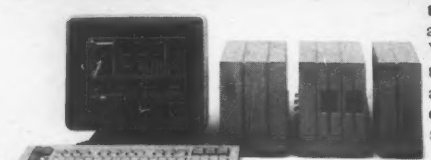
However, the system does not do all that Kerrigan wants it to do. He would like to see an electronic mail system for communicating with different parts of the company and some refinements in the software. For instance, mileage tables are currently computed by "legs."

Mileage from Houston to San Diego is tracked by the Houston-to-Dallas distance, then Dallas to the next leg of the journey and on until San Diego is reached. With refinements that EBS is now working on, mileage tables will be based on a matrix system to figure the distance from starting to finishing point.

Kerrigan also wants reporting functions to obtain statistical information to help Trailways' marketing efforts.

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THE QUESTION ISN'T WHO'S BIGGER. IT'S WHO'S BETTER.

County agency speeds accounting functions with mini

COLUMBUS, Ohio — A county agency that serves 2,000 mentally retarded adults and children found that the minicomputer it bought for payroll purposes was handy for accounting and measuring service effectiveness as well.

In 1981 the Franklin County Board of Mental Retardation and Developmental Disabilities decided to buy a minicomputer mainly to process the payroll of ARC Industries, Inc., which runs facilities providing 900 of the board's clients with contract work, job training and training in independent living skills.

"When I came here, the need for computerization was evident," said Marylin Bryce-Shannals, the board's operations manager. "ARC Industries was a large facility processing many monthly transactions. The majority of business office staff members felt comfortable with their manual accounting system, but this system did not generate adequate management information.

"Once implemented, the computerized system overcame the fears of those comfortable with the old system. Now there is more fiscal accountability, faster information turnaround and a more adequate information base for use in making management decisions," Bryce-Shannals said.

The board, which had used a service bureau for payroll and accounting work, bought a Digital Equipment Corp. PDP-11/23 Plus, which has recently been upgraded to a PDP-11/73.

Payroll processing is complex because each ARC Industries employee is paid an hourly rate based on their productivity on piece-rated jobs. Productivity is assessed by comparing the employee's rate on piece work to a standard rate for that job derived from a formal time study. Extensive reporting is required to assess employee productivity and to comply with Department of Labor requirements.

Thomas Bilodeau, systems analyst for the county board, reported, "I recommended the DEC minicomputer in 1981 because we needed an expandable multiuser system with adequate disk storage. Our agency, with a DP staff of one, wanted strong vendor hardware and system support. DEC offered same-day, on-site hardware repair and telephone support for all DEC layered software."

"At first I was going to write a client payroll system, but development time would have been 18 months. Management decided that to purchase a payroll system would be more cost-effective," Bilodeau said.

The board installed the payroll system and Vertex System Corp.'s Digital Business System (Dibs) accounting system.

It took more than a year to implement the software. Officials reported that although there was top-level management support, some key middle management personnel did not give their full cooperation to the project.

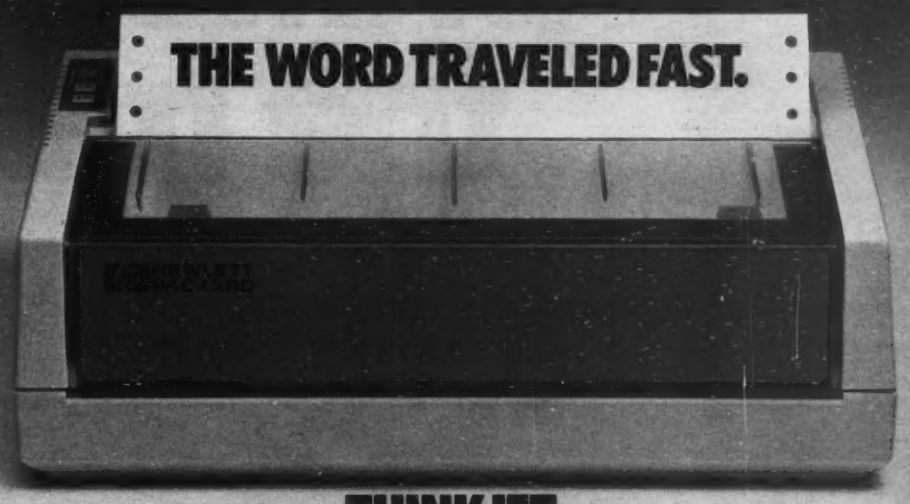
The board is now running accounts receivable, accounts payable, general ledger and payroll. The board reports that these functions are running smoothly.

Personnel reported that the operating RSTS/E has been in existence for 12 years and is well documented, well supported and reliable. They also said the configuration offers centralized security for the agency's data resources.

With the upgrade to a PDP-11/73, the board can do agencywide assessments of services delivered to consumers.

In another recent development, the Franklin County Sheriff's Office donated 10 DEC VT100 terminals to the agency. "We plan to put a terminal in each of our four training centers and in four adult workshops. We will be able to use electronic mail to improve our agency's communications and to expand the amount of information that we keep on each client," Bilodeau said.

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Automated system saves money for state

AUSTIN, Texas — An automated item processing system is the cornerstone of a new Texas state government policy to "get money to the bank faster [and] to have that money earn more money," according to State Treasurer Ann W. Richards.

So far, the state's efforts are reportedly saving $14.3 million annually, with about $3.28 million directly due to the item processing system and much of the rest due to the changes in the way the state invests its money.

Treasurer Richards said the state now gains $1.6 million each year in net additional interest income from daily automated processing of its average of 30,000 checks and 45,000 state warrants. No check stays in the office more that 90 minutes before it is deposited into a bank to begin earning interest. Before, a lag of from two days to a week occurred in depositing the checks that make up the state's tax collections, fees and other income, she said.

The item processing system, NCR Corp.'s Mini-Variable Item Processing System (Mini-Vips), also saves between $13,000 and $15,000 each month by coding the warrants and checks, something banks would otherwise charge the state to do, explained Division Director of Item Processing Michael J. Arias, who said the system performs the same functions as systems used in banking.

The Texas system also:

- Rushes any check over $1 million to a bank immediately after receiving it, earning another $300,000 a year in interest.
- Deposits cashiers' checks directly to the banks that issued them, allowing that money to earn interest immediately and produce an extra $800,000 a year.
- Deposits each day's income to banks that will clear checks faster, increasing the amount of money earning interest and resulting in another $500,000 of earnings. Before, bundles of checks went at random to depositories all over the state, including out-of-town depositories, which created more float.

Richards said the adoption of automated item processing "reduces float, producing substantial increases in interest income; it eliminates encoding charges at the banks; it enables us to handle our large volume of warrants much more efficiently and accurately; permits us to handle our large dollar items much faster; and puts us in a position to push other agencies to speed their handling of items and business related to our office."

The Texas treasurer's office manages money from various sources. Approximately 250 to 300 state agencies make their deposits to the state treasury, which deposits the money in demand or time accounts and invests in U.S. Treasury bills. The state treasurer writes warrants — checks drawn against the state — from these accounts to pay the state's bills.

The Mini-Vips system, Arias explained, processes daily between 90,000 and 100,000 items, both checks and warrants. It consists, he said, of a 14-pocket NCR 6780 Magnetic Ink Card reader/sorter, with in-line microfilmer and roll-on endorser; NCR 8275 processor, NCR 7330 tape drive, NCR 6420 printer, three NCR 7900 video terminals and four NCR 7760 proof machines.

The Mini-Vips software includes NCR's Imos operating system, Proof-of-Deposit/Micro Capture, Reject Reentry and Cash Letter. Other application software was modified by Norcross Software Associates of Dallas.

Richards said the proof machines arrived four days ahead of schedule, the reader/sorter arrived three days early and the process of bringing up the equipment, including programming, took six weeks to reach full production.

During processing, item data is captured on the 8275's disks, then transferred to magnetic tape. The tape is taken to the computer in an adjacent room and run against the outstanding item file. When a new computer is installed later this year, data from the disks will periodically be communicated directly to the system.

When Richards took office, she found a backlog of some 7,000 boxes filled with 18 million old warrants that had been awaiting microfilming. Those warrants were sent to the state library for microfilming and, in the space that was emptied, the item processing division was established. The system has since been able to keep pace with its microfilming work load, she said.



Arias (left) surveying reports.

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Most on-line COM systems make you alter your host computer's software. But not Bell & Howell.

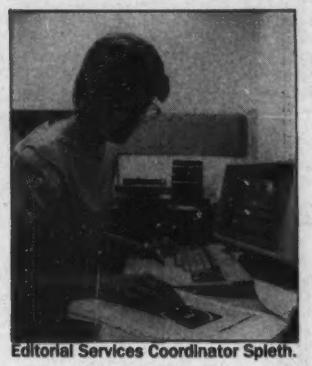
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COM PRODUCTS

System cuts oil firm's budgeting, time-sharing costs



Editorial Services Coordinator Spleth.

AMARILLO, Texas — A petroleum company here discovered that it was going overbudget in preparing its budget. This spurred a decision that not only cut the cost of budgeting, but also provided other benefits.

Mesa Petroleum Co., with assets of $2.3 billion, is engaged in the exploration and production of oil and natural gas. It has a business computer and has also used an outside time-sharing service for budgeting, simulation and financial modeling, according to Larry Roth, manager of computer services at Mesa. However, time-sharing costs were rising, and Mesa's systems managers could see that they might hit $300,000 in expenses for 1982.

Mesa managers knew they wanted a Sperry Corp. 1100/60 mainframe with Sperry's Mapper, an application and report generator, to handle budgeting. They had budgeted for and looked at several minicomputers. At bid time, Sperry came in with "a deal we couldn't refuse," Roth said.

Mapper is an English-language, nonprocedural system that enables users without DP experience to set up their own data bases; input, output and massage data; and generate reports to suit their individual needs.

Mesa also installed the Interactive Financial Planning System developed by Execucom Systems, Inc.; and Oil and Gas Reservoir Economics (Ogre) simulation, by David P. Cook & Associates, both of which Mesa had been using on the time-shared system.

"We expected a 27-month payout from the new system, just based on budgeting and modeling," Roth said. "But with Ogre moved off time-sharing and onto the 1100 system too, the payout took just 18 months."

Recently, Mesa personnel developed software and modified hardware to set up a 56.2K bit/sec communications link between the Sperry 1100/60 and their NCR Corp. 8565MP business computer. "We can initiate jobs on either system, update and integrate the main computer's data base via terminals tied to the 1100/60 and use the best assets of both computers to get done what needs to be done," Roth said.

"Mapper was a significant factor in selecting the 1100/60 because it provides a way to reorder information and pull it back out quickly," explained William T. Miller, supervisor of scientific systems. For example, it is simple now to pull out sub-budgets for Mesa's partnerships and trusts, programmer/analyst John R. Carmen said.

Five hundred contracts covering more than 2,000 wells are now stored under the Mapper system by contract, replacing a manual system.

Searching for references to media clippings is expedited in a system devised early this year by Editorial Services Coordinator Jo Lou Spleth in about a day. Spleth has stored entire quotes in some cases or key words, phrases and names in others.

Miller has a complete inventory of Mesa's computer hardware on Mapper. He also has assorted record reconciliation and record keeping.

Turning from fiscal fitness to physical fitness, the new system allows users of the corporate fitness center to produce a report that calculates kilocalories burned per kilogram of body weight per week. Also printed are monthly reports using stored data for research regarding sick time/fitness correlation.

"The assistance of the computer services department is still required to help the user really get the benefits of Mapper," Roth said.

"As we introduce people to Mapper, we try to shelter them at first and give it to them menu-driven," Miller explained. "About 10% of these users become quite innovative with the software. They figure out where the data is stored, go in with manual functions and, typically, change their output or report formats to fit their needs [better]."

"Mapper is not the answer to processing large volumes of data," Roth explained. Mapper always has priority on the system, and users get angry when the system slows because someone is running a big job on Mapper, he said.

"Other than that, though, it is particularly valuable to Mesa because we have a very small group of very technical employees — and a small number of employees overall. We don't have the luxury of helpers to assign to terminals, and a technician in one area doesn't have the time to become an expert in another employee's area," Roth added.

Miller said Mesa's approach with the 1100/60 is to make its power readily available to users and let them do with it what they need.

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NEWS

Time-sharing net aids firm's sales

LAWRENCE, Mass. — Genesys Software Systems, Inc., a three-year-old human resource software firm here, is using the remote computing resources of a time-sharing network to bring its software to the marketplace.

Genesys President Larry Munini said his firm uses Boeing Computer Services Co. computer resources to support several marketing activities, including demonstrations of the firm's human resource software at sales offices nationwide. An on-line capability called All-Screen provides terminal access to Genesys programs.

Genesys demonstrates its Human Resource Management System software via IBM 3270 series terminals linked to Boeing's mainframe remote computing facilities via the Boeing Telecommunications Network. This system is said to include three-second system response time, 99% host availability and network service.

According to Munini, "Our salespeople are able to invite prospective buyers to our office [where they] receive a hands-on demonstration of the product. Instead of just talking about the theory of what it can do, we sit the customer down and show him how the system operates, how it can be adapted to perform particular calculations and modified to meet specific requirements."

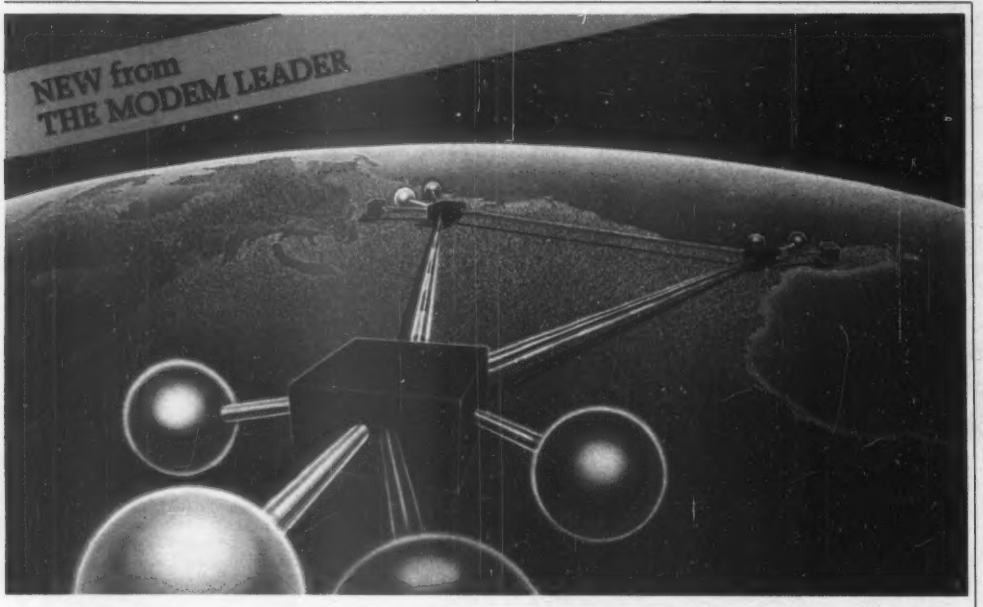
Traveling demonstrations

Demonstrations are not always tied to Genesys' sales office-based terminals, Munini said. "Genesys' sales staff travels around the country, giving seminars every Tuesday, Wednesday and Thursday using an IBM 3279 color graphics terminal. We set the equipment up the night before a session, shut it down by four, get it to the airport, meet it in the next city and repeat the cycle."

At times, the Genesys demonstrations are held at Boeing sales offices, avoiding the need to ship equipment around the country. And there are also times when a Genesys sales representative takes the entire show into a client's office, setting up on a desktop. This involves use of Simware, software available on Boeing's Mainstream remote computing services, which permits inexpensive terminals to emulate 3270 operation. "Now we can take any terminal or personal computer, plug it into somebody's regular phone outlet, dial up the Boeing Network and give a demonstration of our product right on the spot," Munini said.

Genesys representatives can also file customer status reports from telephone booths. "A lot of people complained that because they must travel frequently, they don't have time to get back to the office and file these reports," Munini said. With the help of a Radio Shack Corp. TRS-80/100 with a built-in modem, sales representatives and technical personnel can tap into the Boeing system from a hotel room or anyplace else they find a phone.

Munini concluded, "Genesys obviously needs a mainframe to support its marketing operations. But we don't want to be in the data center business. By using Boeing, we take advantage of all their resources — processing power, expert systems programming, software library, file security and other features."



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Firm's program turns nonusers into micro 'junkies'

HARTFORD, Conn. — United Technologies Corp. (UTC) here decided to incorporate microcomputers into its management procedures from the top down. It established a program that so far has taught 1,300 of its senior managers to use personal computers.

The $13 billion firm — whose product line includes Pratt & Whitney Aircraft Co. aircraft engines, Otis Elevator Co. elevators, Carrier air conditioning systems and Mostek Corp. semiconductors — spends the largest amount of its sales dollars on indirect labor for sales, service and managerial support.

Because it wanted to increase cost efficiency through managerial effectiveness, the company established an Executive Personal Computer Training Program.

The program's initiators, Stillman B. Brown, UTC's executive vice-president of finance and administration, and John H. Bennett, corporate director of data processing, quickly realized that many of their managers had never touched a computer. Some already had computers in their departments, though they had no direct contact with them and steadfastly refused to authorize their use.

Brown and Bennett felt that if 800 of the approximately 1,200 UTC senior managers volunteered to take the course, the program would be a success. To encourage some executives to sign up, a videotaped message by Harry J. Gray, UTC's chairman and chief executive officer, was prepared to confirm top management's commitment to the program.

The response was overwhelming, according to Bennett. Among the first to sign up for the course was Brown himself, with virtually all the chief financial officers, the vice-president of engineering and sales and marketing executives following along.

To implement the training program, Bennett selected the IBM Personal Computer and Context MBA, a decision-support software system from Context Management Systems, Inc. of Torrance, Calif.

In selecting the software, Bennett looked for something that could address applications such as electronic spreadsheet, word processing, business graphics, data base management and telecommunications.

"We explored individual software programs for each of these applications, but we soon concluded that they couldn't be used effectively in teaching the course," Bennett said. "What we needed was a single package that integrated all five of these basic applications.

"One factor in Context MBA's favor was that it ties together all those functions with a common interface and command structure. It would be entirely impractical, from both a training standpoint and for continued use, for the executives to have to learn a different set of protocols and procedures for each individual application software package," Bennett said.

Three-day training

Once the hardware and software were selected, Bennett enlisted National Training Systems, Inc. of Santa Monica, Calif., to develop course materials and to conduct the three-day training program.

The UTC Executive Personal Computer Training Program is conducted at the corporation's research center in Hartford, where managers from UTC's home office and from its Palm Beach, Fla., facility have gathered in groups of 15 or 16 since the first class was held in December 1982.

So far, Bennett said, about 1,300 managers have completed training, including 84 executives based in London. Upon graduation, each trainee receives an IBM Personal Computer and a copy of the software programs.

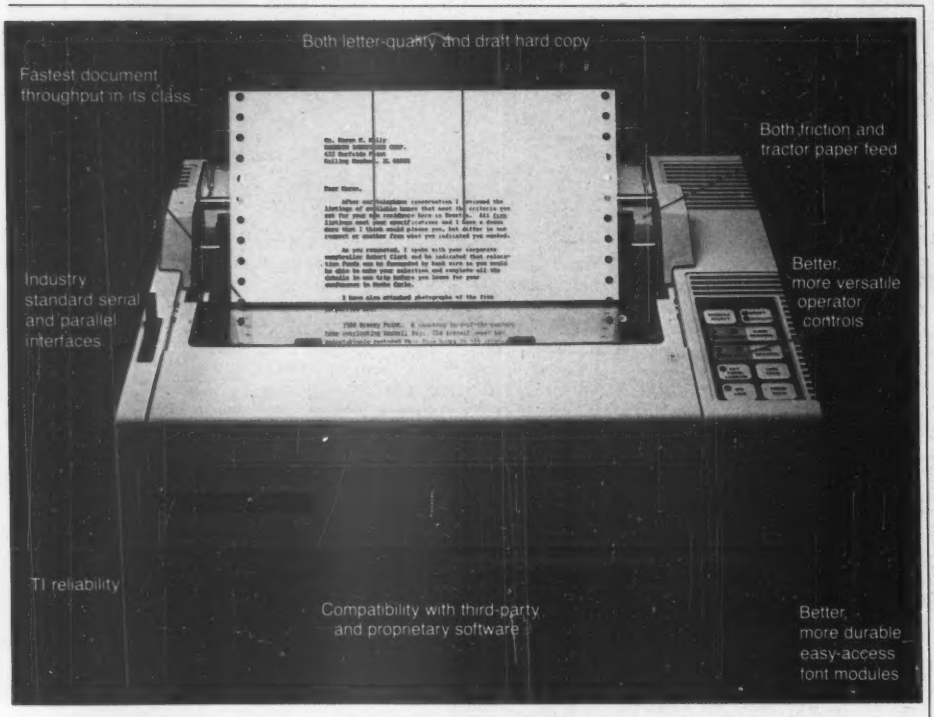
"We have no policy regarding what computers and software they can use," Bennett said, adding, "A majority of them are sticking with the IBM Personal Computer and the Context MBA software."

According to Bennett, the $5 million training program is an investment in the future of the corporation and its senior personnel. "In the long run, it will change UTC dramatically — and for the better," he predicted. "Already I see changes in many departments, including changes in attitudes. Some of the managers have become 'computer junkies,' and I'm talking about guys who wouldn't even hear of authorizing a personal computer purchase in their departments a year ago."

About 2,000 personal computers have been ordered at UTC since the program began, including those presented to the training course graduates.

. "One of the future benefits from this program will be a workable micro-to-mainframe link made possible by the capabilities of Context's Corporate MBA," he predicted. "Right now, most managers are creating their own data bases and don't have many programs they want to access on our IBM 3083 mainframe. But the potential is there, and I see the link getting stronger.

"It's clear to me that having the right tools and teaching the right people how to use them will measurably improve managerial effectiveness and efficiency throughout our entire organization," Bennett said.



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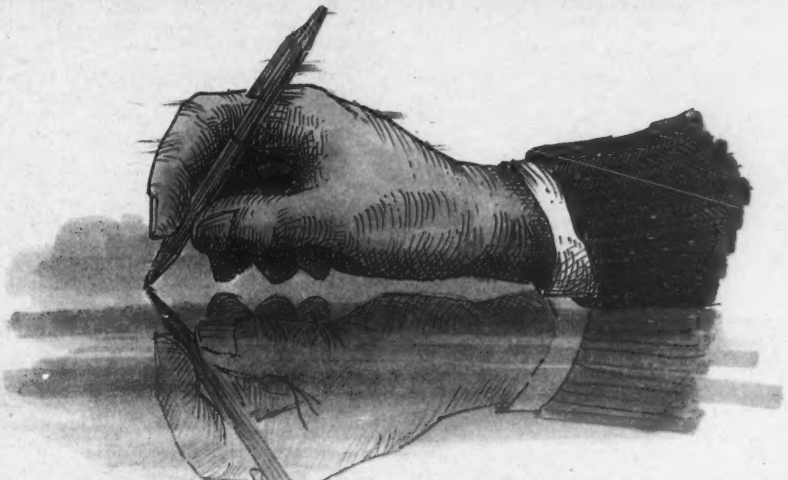
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NEWS

DBMS streamlines manufacturing at Hughes Aircraft

EL SEGUNDO, Calif. — At Hughes Aircraft Co.'s Space and Communications Group (SCG) here, a data base management system (DBMS) and a set of DBMS-integrated software have streamlined the aerospace giant's manufacturing process and improved the development of end-user applications.

"We carved out a core mission for SCG's management systems organization: to develop those information systems that cut across divisional boundaries and rely upon a large base of common data," said George Emmanuel, manager of product development and support for SCG.

"The DBMS approach we have adopted made it possible for us to pursue that mission, and the integrated software has provided us the tools we need [both] to encourage and manage end-user application development," Emmanuel said.

Eight-module software

The integrated software SCG uses is Cullinet Software, Inc.'s Manufacturing System, which comprises eight modules covering material requirements planning, master production scheduling, order entry, cost control, inventory control, shop floor control, purchasing and bill of material. The system is integrated with Cullinet's Integrated Database Management System (IDMS), providing a common base of data to run the manufacturing modules.

The vast majority of Hughes SCG's daily engineering and development activities are carried out in three different laboratories: communications, space vehicles and control data systems.

"While each [laboratory] naturally tends to think that its needs are unique, requiring a dedicated system to satisfy them, our charter was to use IDMS to develop one system and data base that could satisfy the common, generic application needs of these diverse laboratories," according to Emmanuel. Over the last two years, Management Systems achieved that by developing two major engineering modules: a summary parts list (SPL) and a drawing parts list (DPL).

The SPL module provides one parts list data base that can be used by all SCG divisions and projects. The module maintains and makes accessible the comprehensive historical data needed for long-range parts forecasting and purchasing. The DPL module enables every SCG project to create official parts lists directly from drawings and makes it possible to order the specified parts immediately.

"What we found," Emmanuel observed, "was that each [laboratory] had essentially the same problem. They differed only in their perspectives [of the problem] and in the words they used to describe it.

"The network architecture of IDMS enabled us to write a single, generic application — providing each lab with its own distinctive view. The communications laboratory can access minute module details, space vehicles can query the data base for assembly-level data and control data systems can view it in the slices it is accustomed to dealing with — all through the same application program."

The second major need addressed by Management Systems was the development of an integrated manufacturing system for Hughes SCG.

The SCG manufacturing environment is totally project-oriented, with each communications satellite that it develops customized and built to the unique requirements of individual customers. The process requires a very close working relationship between engineering and manufacturing to manage the numerous design changes that typically are made until the time of the final system integration.

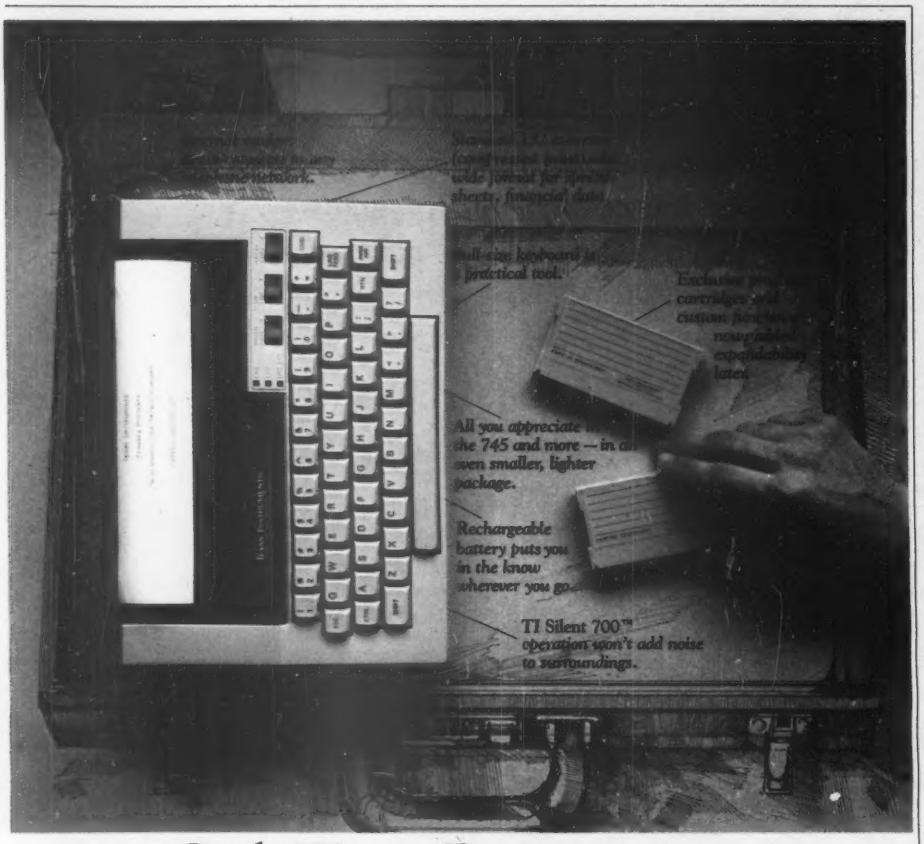
Decision to buy

Faced with a "make-or-buy" decision, SCG decided to purchase the integrated Cullinet Manufacturing System. "The package met a large portion of our requirements, and the obvious benefits of its integration with IDMS were compelling," Emmanuel said.

To manufacture something as complex as a communications satellite, management needed in-depth control over all phases of the manufacturing process — including material requisition, purchase order preparation, receiving inspection, inventory, parts disbursement, physical manufacturing, subcontracting and reworking. The eight integrated modules included in the Cullinet Manufacturing System provided the full range of capabilities required at SCG, according to Emmanuel.

Hughes is currently customizing the Manufacturing System with Cullinet's support in order to meet the unique requirements of SCG. Those refinements include the ability to make side-by-side comparisons of the systems as they are designed and as they are built to reflect engineering changes accurately, Emmanuel said.

In addition, SCG hopes to be able to perform complete backward and forward traceability of materials by lot number or serial number and to control purchase requisition changes separately from purchase order changes.



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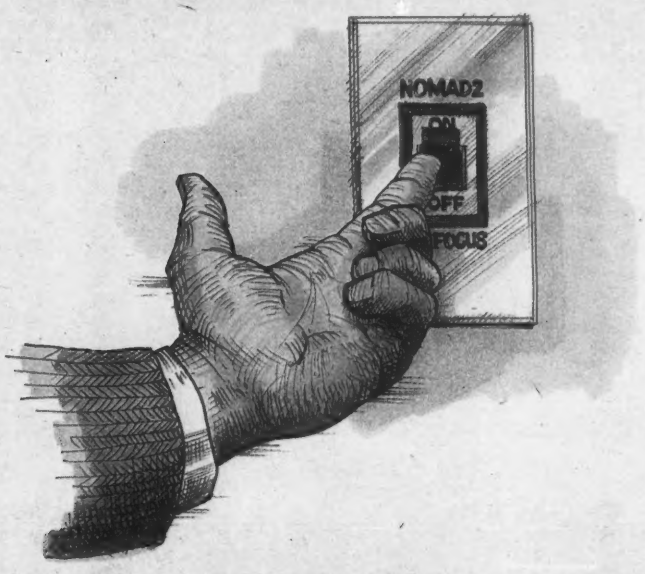
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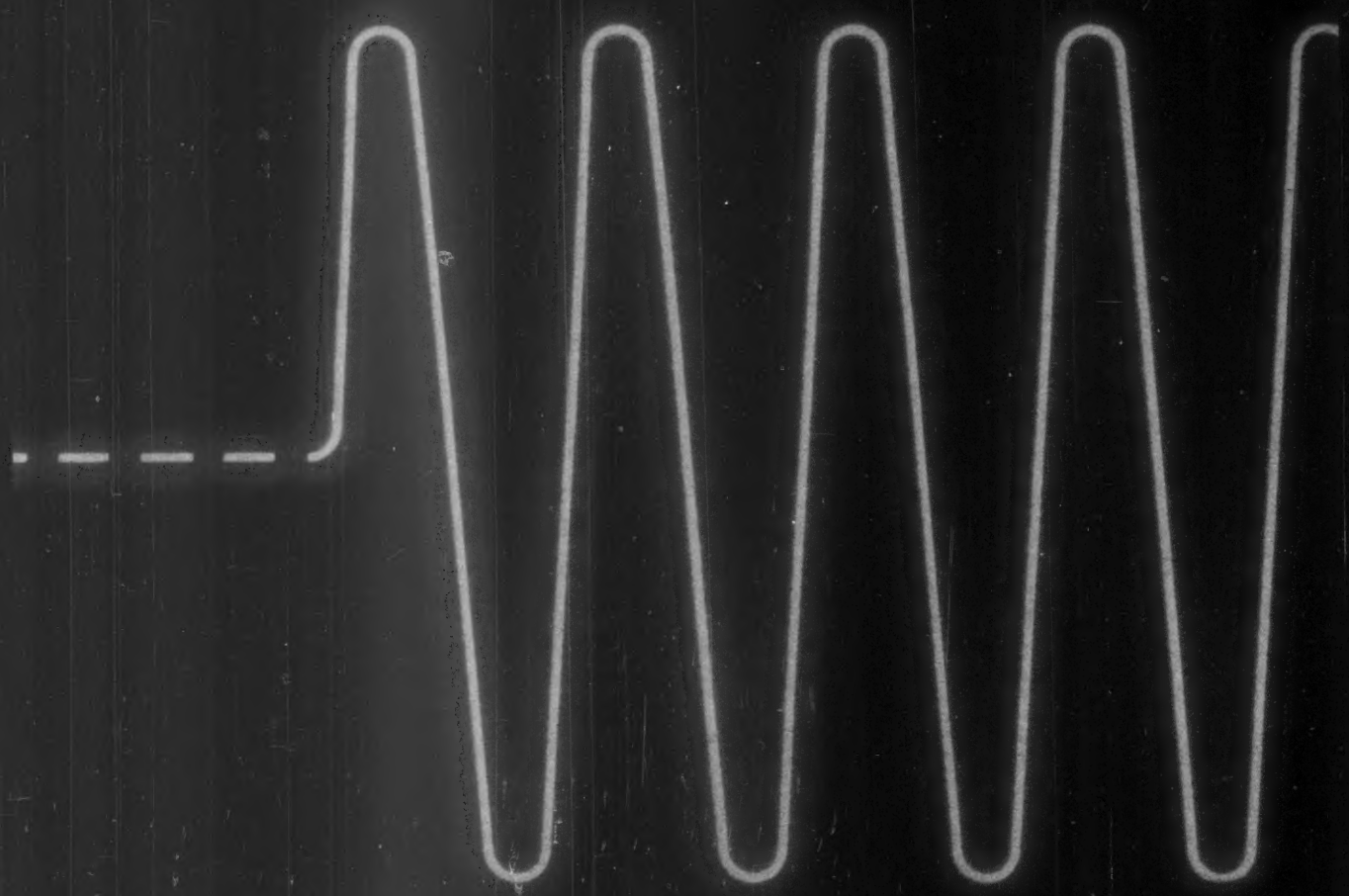
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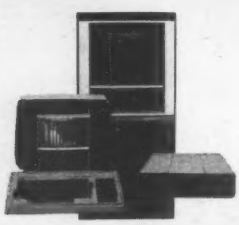
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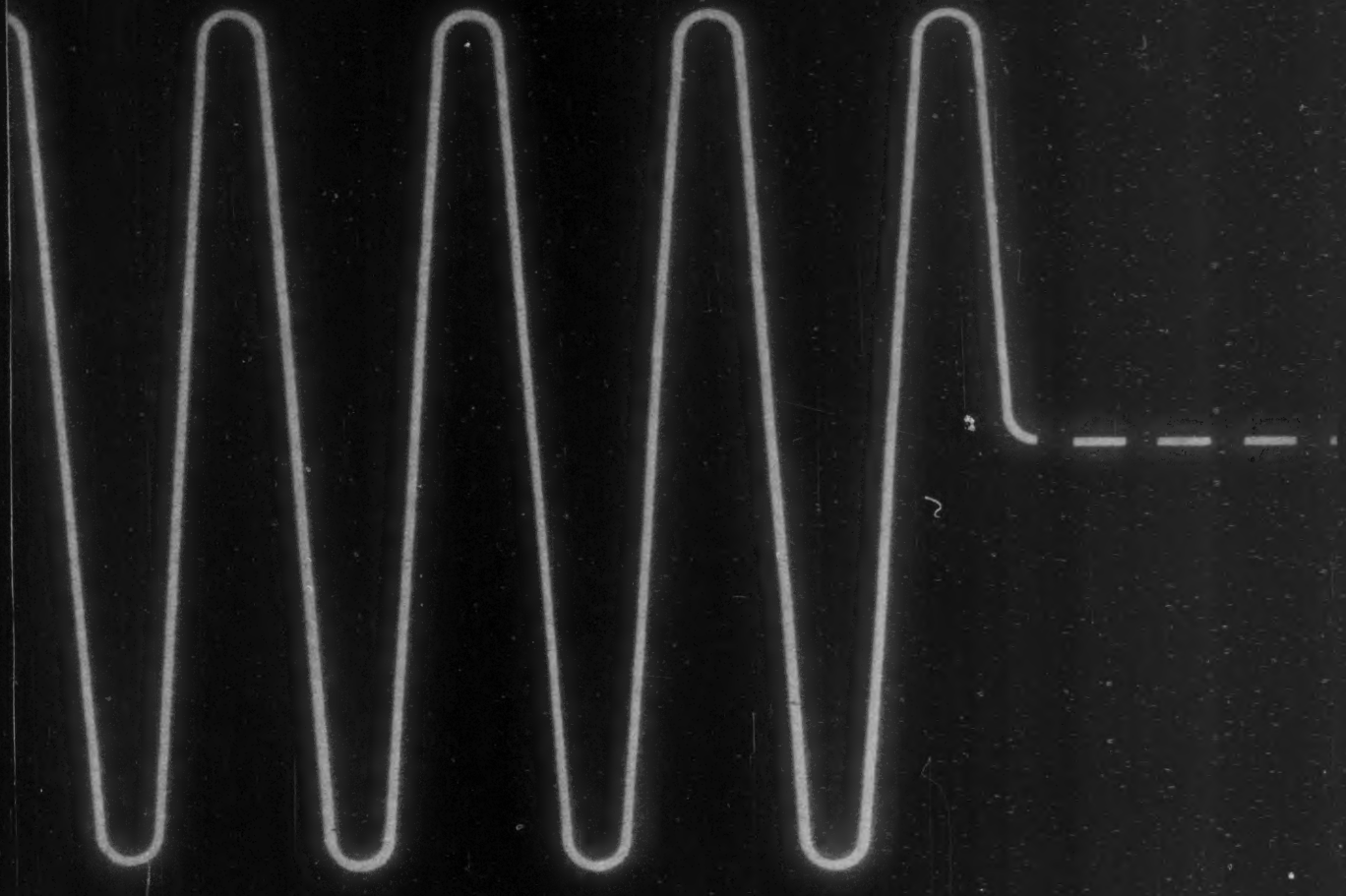
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WHEN YOU'VE GOT TO BE RIGHT.

AT&T Information Systems

Graphics a potentially powerful force in business world

By Arthur W. Evo
Special to CW‡

The availability of inexpensive and sophisticated graphics may turn out to be as powerful a force for change as the microcomputer itself. Access to the wealth of data that can be stored in computers is limited by the mind's capacity to absorb information.

When information is presented in words and numbers, it is taken in one item at a time in a linear fashion. When information is presented in a graphics form, it can be absorbed quickly and remembered as a set of patterns and images.

Presently, most of the information that people get from computers comes to them as words and numbers. Adding the capacity to display information in graphics form will dramatically increase the speed with which people can assimilate and use that information.

Business graphics are used for three purposes: to describe, to analyze and to persuade. Descriptive graphics are developed from existing data and typically are used to provide a visual summary of information contained in periodic reports. Analytic graphics are ordinarily used when the task at hand is to represent visually the information that is being analyzed for group decision making. Persuasive graphics are developed after a decision has been reached, usually in an attempt to obtain the support of others for that decision.

It will help to remember these categories, although the distinctions among them are often blurred in organizational usage.

Graphics underutilized

In today's office, graphics are underutilized because the methods used in preparing visual aids are either too expensive, cumbersome or time-consuming. The creation of pictures, slides, maps and free-form designs usually requires specialized skills and expensive equipment.

Visuals that are based on the use of boxes, lines and words (for example, flow charts) necessitate much time and attention to detail from support staff. Until recently, even graphs and numeric tables required the use of costly software and large computers.

During the past several years, inexpensive and easy-to-use graphics software, which can be used on microcomputers, has appeared in the marketplace. Much of this microcomputer software is still limited to the production of graphs, charts and tables.

Furthermore, it is difficult for this microcomputer software to create graphics displays from information that already exists in mainframe computers. But in spite of these limitations, sales of graphics software for microcomputers have been rising rapidly. As prices decline further and as increasingly sophisticated microcomputer graphics become available, greater interest will be generated.

Limitations disappearing

The current limitations on microcomputer graphics will disappear during the next five years. By then, nontechnical personnel will be able to use microcomputers to create sophisticated graphics — pictures, slides, maps, overhead transparencies, free-form designs, graphs, tables and flow charts — from information stored in the organization's main computer or on a subscription basis from an outside source.

The availability of integrated microcomputer graphics will influence the way management personnel communicate and carry out their decision-making responsibilities.

As they prepare to act in their decision-making role, managers must absorb and

Eve is a professor at the University of Massachusetts and is the associate director of the university's Institute for Governmental Services.

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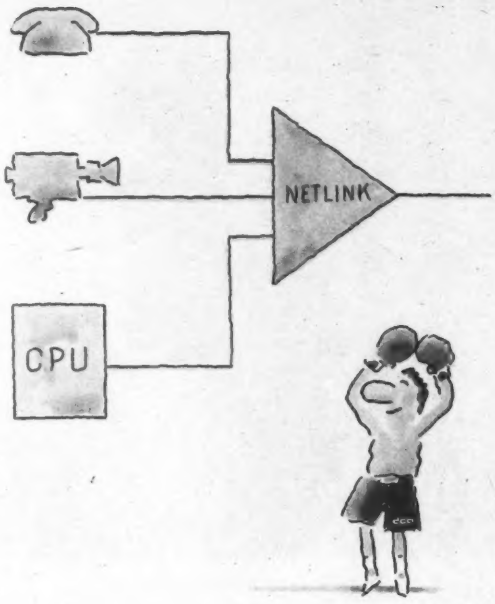
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affecting information assimilation, managerial style

interpret ever-increasing amounts of information. The manager's information-gathering task involves summarizing large masses of data quickly, as well as selecting important subsets of that data for analysis.

Once the data has been selected, managers need to apply their analytical skills during the decision-making process. Communication skills are also needed for group decision making and when persuading others of the appropriateness of a decision that has already been made.

The descriptive, analytical and persuasive attributes of graphics will significantly improve the ways in which managers communicate and carry out their decision-making responsibilities.

Advantage gained

Managers who learn to use graphics now will gain an advantage that will last until graphics have become an integral part of the management scene. By that time, a reliance on visual image communication will have influenced the types of managers who are selected for promotion in much the same way that the use of television has changed the types of political candidates who are successful.

A key ingredient for future management success will be the ability to absorb and communicate information in patterns and images rather than in the traditional linear fashion. The skillful use of graphics will enhance an individual's effectiveness in this visual communications arena.

Changes in managerial style will be influenced by a concern over how managers use their time. Increasingly, time will be viewed as a commodity that has at least as much value as money. Managers currently spend up to 60% of their time in meetings, where the primary communication mode is verbal, supplemented by communication through the use of printed words and numbers.

Increased efficiency

The efficiency with which information is shared in meetings will be increased as graphics become increasingly available for managerial use. People generally retain only 10% of the information that they hear. This figure jumps to 50% when visual aids are used to assist in the communication process.

There is great diversity in how managers carry out their communication and decision-making responsibilities. This diversity reflects both the unstructured nature of the manager's role and the stylistic differences that managers bring to their work.

Managers value those techniques that have worked well for them in the past and will prefer to use microcomputers that can be adapted to their individual styles of communicating and decision making.

Compared with larger computers, microcomputers are easier to use and less expensive — two appealing assets. A manager will also be attracted to microcomputers because of his need to carry out certain activities in private in order to preserve the confidential nature of the information that is used.

As microcomputers become readily available to other personnel in the office and as costs decline further, microcomputers will be assigned to increasing numbers of managers for their exclusive use as executive workstations.

Most managers prefer to carry essential data with them wherever they go, whether they are attending a meeting down the hall or traveling to other parts of the country. Inexpensive briefcase-size portable microcomputers that provide quick and easy access to information are now available.

As the size, weight and cost of portable microcomputers decrease over the next several years and as their data handling capacity increases, portable microcomputers will become an indispensable part of the manager's support system.

Information that is communicated in graphics form can be absorbed quickly and remembered as patterns and images. As inexpensive and sophisticated microcomputer graphics become available, current approaches to decision making and communication will change.

Computer graphics are especially helpful in an office situation when they are used for descriptive, analytical and persuasive purposes. Managers who learn to use graphics as a means for rapidly communicating information will be able to use their time with greater effectiveness, and this could lead to greater promotability.

Managers should learn about microcomputers and experiment with graphics applications in their work settings as a way of preparing for these changes.



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CALENDAR

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OCTOBER 1-4, NEW YORK — **Managing with Micros.** Contact: U.S. Professional Development Institute, Department ABCDEF, 1620 Elton Road, Silver Spring, Md. 20903.

OCTOBER 1-4, ANAHEIM, CALIF. — **Autofact 6 Conference and Exposition.** Contact: Computer and Automated Systems Association of SME, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

OCTOBER 1-4, SAN ANTONIO — **System 1022/1032 Users Conference.** Contact: Software House, Inc., 1105 Massachusetts Ave., Cambridge, Mass. 02138.

OCTOBER 1-4, NEW YORK — **The Information Management Exposition & Conference (Info '84).** Contact: Show Manager, Info '84, Cahners Exposition Group, 999 Summer St., Stamford, Conn. 06905.

OCTOBER 1-4, CHICAGO — **The Fourth Annual Conference on Control, Audit and Security of IBM Systems.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

OCTOBER 1-5, SUNNYVALE, CALIF. — **Capacity Planning and Modeling.** Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

OCTOBER 1-5, NEW YORK — **IMS/DC and Message Format Services Programming.** Contact: Sysed, Inc., 35 W. 35th St., New York, N.Y. 10001.

OCTOBER 1-5, PHILADELPHIA — **Systems Design.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

OCTOBER 1-5, BOSTON — **Systems Analysis.** Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

OCTOBER 2, ROCKVILLE, MD. — **Engineering Project Management.** Contact: Center for Management Development, University of Maryland, College Park, Md. 20742. Also being held Oct. 3 in Columbia, Md., and Oct. 4 in Timonium, Md.

OCTOBER 2, SAN MATEO, CALIF. — **Video Display Symposium.** Contact: American Electronics Association, P.O. Box 10045, Palo Alto, Calif. 94303. Also being held Oct. 4 in Minneapolis.

OCTOBER 2, NEW YORK — **Data Communications Protocols II — Introduction to SDLC Protocols and ADLC Comparison to BSC.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

OCTOBER 2-3, HARTFORD, CONN. — **Focus Query Language for End-User Personnel.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

OCTOBER 2-4, SINGAPORE — **Infomatics '84.** Contact: International Information Management Congress, P.O. Box 34404, Bethesda, Md. 20817.

OCTOBER 2-4, CINCINNATI — **Focus on Data.** Contact: Du Pont Statistical Seminars, Room X-40236, Wilmington, Del. 19898.

OCTOBER 2-4, SAN FRANCISCO — **How to Select and Implement a Telephone System.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

OCTOBER 2-5, HARTFORD, CONN. — **Focus Query Language for DP Personnel.** Contact: Data Base Management, Inc., 1075 Tolland Tnpk., Manchester, Conn. 06040.

OCTOBER 2-5, PALO ALTO, CALIF. — **Distributed Processing: Mini and Microcomputer Implementations.** Contact: Integrated Computer Systems, Inc., P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045.

OCTOBER 3, NEW YORK — **Vsam: Performance, Design and Fine Tuning.** Contact: Women in Data Processing, Inc., Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

OCTOBER 3-4, DALLAS — **Data Communications II — Digital Communications Systems.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

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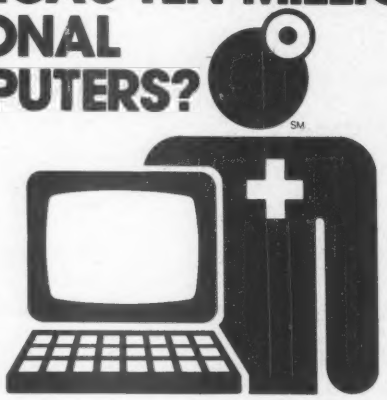


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NEWS

OCTOBER 3-5, MONTEREY, CALIF. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

OCTOBER 3-5, CHERRY HILL, N.J. — **Local-Area Networks.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

OCTOBER 3-5, SAN JUAN, PUERTO RICO — **Network Communications Protocols.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

OCTOBER 3-5, HASBROUCK HEIGHTS, N.J. — **New-Generation PBX.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

OCTOBER 3-5, DETROIT — **Networking Personal Computers.** Contact: Data-Tech Institute, P.O. Box 569, 386 Franklin Ave., Nutley, N.J. 07110.

OCTOBER 3-5, ST. PETERSBURG BEACH, FLA. — **Fundamentals of Finance and Accounting for the Non-Financial Executive.** Contact: Information Services, 30-30 Borden Ave., Long Island City, N.Y. 11101.

OCTOBER 3-5, BOSTON — **Data Communications and Networking for Personal Computers.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

OCTOBER 3-5, WASHINGTON, D.C. — **Data Base Administration and Data Resource Development.** Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

OCTOBER 3-5, UNIONDALE, N.Y. — **Communications Managers Association Annual Conference.** Contact: Communications Managers Association, 40 Morristown Road, Bernardsville, N.J. 07924.

OCTOBER 4-5, ATLANTIC CITY — **Software Verification and Validation.** Contact: Education Foundation of the Data Processing Mangement Association, Department SVV, P.O. Box 3608, Torrance, Calif. 90510.

OCTOBER 4-5, NEW YORK — **Telecommunications II: Integrated Voice/Data and Digital PBX.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

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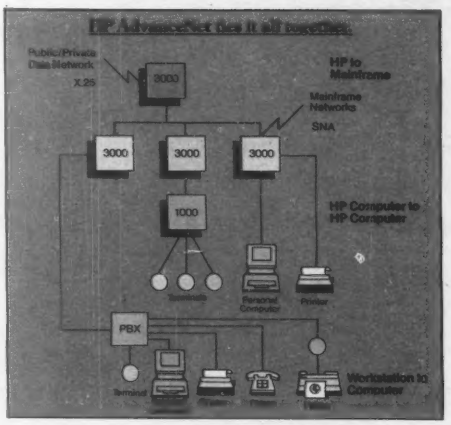




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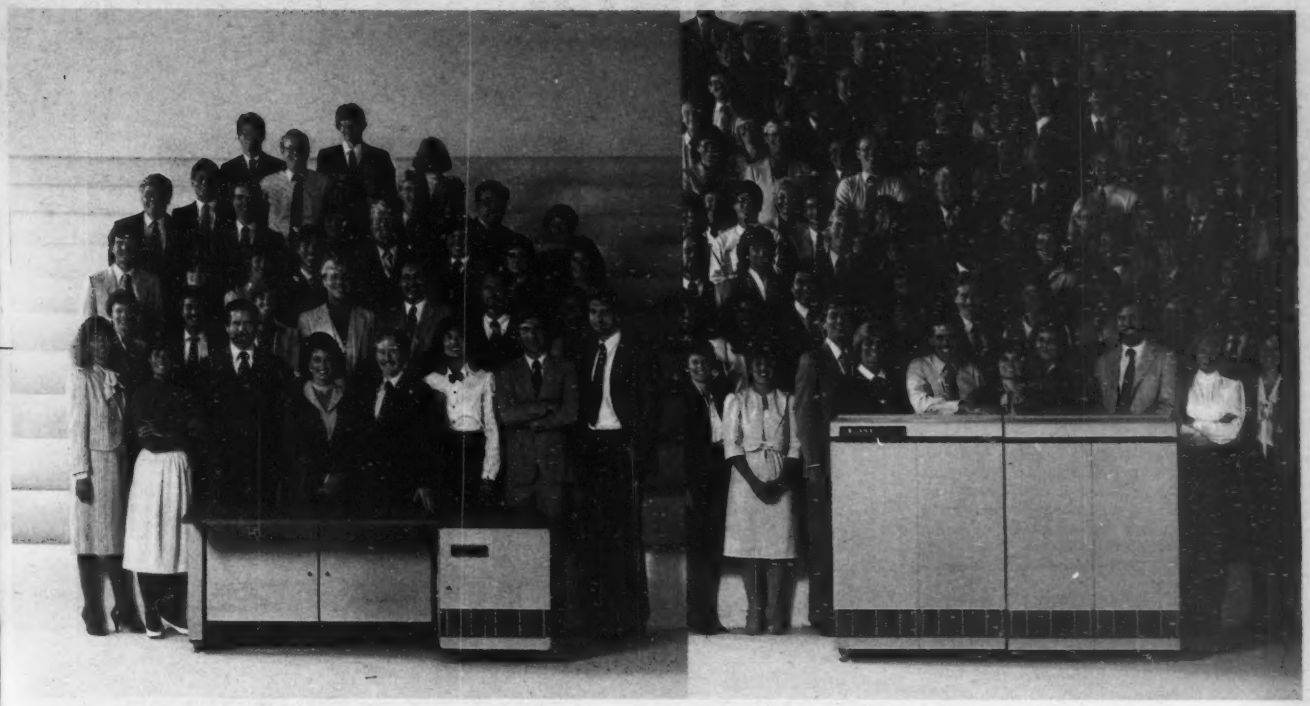
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EDITORIAL

DP: New money, same headache

Results of the MIS budget survey of large shops [CW, Sept. 17] were a classic instance of good news and bad news for DP managers.

The good news was that, for the first time in a decade, they will have more instead of less to spend on hardware, at least those managers polled in the big shops (average $31 million in annual MIS outlays).

Now the bad news. The additional average $400,000-plus that managers have to spend will be more than offset by an increase in corporate demands on their shops. What this translates into is the same Excedrin headache in good times that managers have dealt with in comparatively lean times, namely filling mounting demands in the face of limits, often imposed by the same corporate heads making these demands.

For example, the Diebold Group, Inc. survey found that the MIS staff head count in 1984 grew less than half as much as it did two years ago, with many respondents reporting real *declines* in staff size. All this at a time when American business and industry have kicked into high gear following a prolonged recession.

And what is further complicating matters for the managers today is the recent end-user computing phenomenon. While this might well eventually remove a great burden from the DP shop, it is becoming clear that the end-user movement has placed extra demands on the shop, both in terms of training as well as planning, purchasing and implementation of hardware and software.

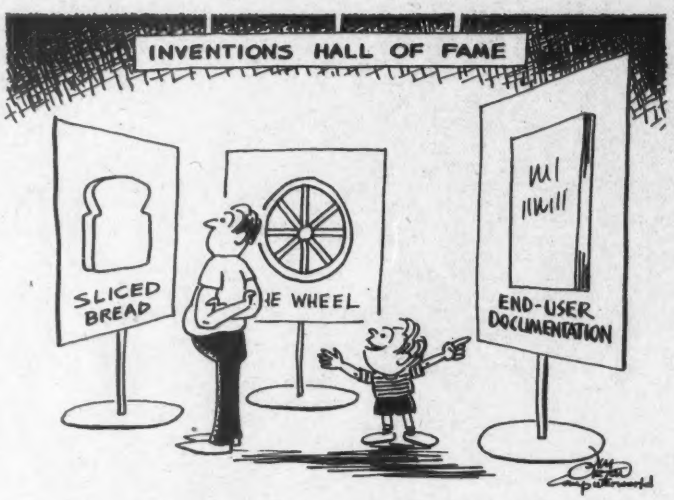
What's a manager to do?

It has been said countless times at countless seminars and conferences by countless consultants, management experts and gurus, but perhaps has never been more true than today: The role of the DP manager is changing very rapidly, and flexibility in dealing with the changing DP environment will be the measure of success in meeting the challenge of the eighties.

One Diebold researcher pointed out that DP managers must aid and abet the proliferation of end-user computing. But so often what is heard from people associated with emerging information centers is that DP management is more a stick-in-the-mud than an invaluable source of help in putting computer solutions directly in the hands of end users. As the survey's findings showed, there will be plenty of work for everyone, and, this year at least, not enough extra money to keep pace with demand.

Researchers also recommended a greater reliance upon purchased software instead of in-house development, a wise suggestion in light of the decline in the growth of DP staffs. A pitch was also made for increased automation in standard computer operations as well as the adoption of advanced systems development methods.

All of the above spell significant changes in the way DP managers do their business. These are not changes for the sake of change, but changes spurred by the breakneck pace of technological development, which is itself fueling wholesale changes in the fiber of corporate life. As one Diebold researcher commented, the most significant obstacle to dealing with the forces of change just may be the "weight of the past."



'Daddy! Come look at this one!'

LETTER

Electronically stored data not immune

In response to "A thorny problem for the court" [CW, Aug. 27], I am amazed that attorneys were not consulted concerning the basics of First Amendment defamation law. They would have explained that the stricter requirements imposed by the First Amendment on plaintiffs that sue a media defendant came about because the courts were "flexible enough to take into account the dynamic nature of things."

The reason the plaintiff has the burden to show malice is because the U.S. Supreme Court felt to do otherwise would potentially chill the freedom of the press.

Furthermore, the classification of the plaintiff is material. Is he a public or private figure? Public figures must show malice. A private person need only show negligence.

As for Dun & Bradstreet Corp., they maintain a credit data base. They provide a service not to the public, but to private individuals.

The high-priced lawyers that represent Dun & Bradstreet have kept alive their client's chances; however, they will lose. They incorrectly base their arguments on the fact that their information is stored on an electronic data base.

How the information is stored is totally irrelevant. The tone of the editorial suggests that rooms full of gigabyte drives are different from rooms of filing cabinets when it comes to errors caused by negligence. This is absurd. The First Amendment will not protect them.

Elliott Lieberman
Oakland, Calif.

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VIEWPOINT

Breaking away from an age-old pattern



LECHT ON SCIENCE
Charles P. Lecht

As time marches on, unfolding before us is the same system that was with us in the past, is with us now and will be, by my reckoning, with us for a long time to come. Its design, like that found in the science of phylogeny, recapitulates an ontology — one relating to the origin of computer systems development and which speaks of its nature in the scheme of things. But that's getting ahead of myself. I'll begin at the beginning, which I'll arbitrarily set in the ages of darkness, circa 1000 A.D.

In those days, computer systems were composed of groups of human beings united in common purpose and orchestrated to create solutions to the problems of the day. Housed in honeycombed edifices perched on hills, along rivers and on great plains, each provided its users with data processing powers otherwise unobtainable. However slow and inaccurate these systems were, they were the best available. Multiprogrammed, time-shared and multitasked, they constituted systems that controlled needed processes of every conceivable form — scalar, vector, parallel — you name it. And as you might expect, they came in different sizes; there were micros, minis, midis and macros. Even super systems appeared here and there.

There were as many "devices" attached to each processor as it had been designed to handle. Input was achieved through use of the most advanced optical character recognition (OCR) technology — the eyes of human readers. Output was achieved through the hands of scribes. Memories were as diverse in nature as the times would permit; metallic, stone and wood typified the available read-only memories (ROM). Paper was the only practical, erasable and programmable ROM, scratch pad and highly volatile random-access memories existed in protoplasmic forms — the brains of people and other living creatures — which were the only things capable of effortlessly storing and retrieving data.

Powerful controllers orchestrated the system's performance so that device contention was minimized. Along with all the benefits found in these systems were problems not unlike those found in today's. Deadly embrace, thrashing, overheating and breakdown typified these systems; even loss of power occurred, rendering entire systems useless. And talk about I/O bottlenecks! Long wait times were as commonplace as data, which arrived on ships and by land to make its way to systems. As it is currently, no matter how vast systems' memories were, they would soon overflow. Much would be lost for eternity long before it could be retrieved and put to use.

The brand-name banners by which people referred to these early DP systems were as diverse as they are today. Among the general purpose types we can note are school, encampment, castle, town, city, state and nation. All were collectives of human data processing power.

Communications were unreliable and slow, but everything that was needed eventually arrived. Coming over asynchronous, bisynchronous, packet-switched, line-of-sight (and what have you) lines, data was handed off to local-area networked residents to be processed by special and general-purpose subsystems, which found their expression in the specialized skills of their inhabitants. Short- and long-distance signaling were accomplished with smoke, mirrors and drumbeat if a runner or a horseback rider — or a bird — couldn't be found to carry off the task.

The brand-name banners by which people referred to these early DP systems were as diverse as they are today. Among the general purpose types we can note are school, encampment, castle, town, city, state and nation. Those of greater specificity included monastery, trading post, military camp and prison. All were collectives of human data processing power. The spectrum of master/slave relationships, which provide us with such order as may be essential during times of cruciality, were a natural and to-be-expected byproduct of the social institutions of the time.

Data base technology existed, and access methods were, as you might expect, woefully inadequate by today's standards, but every bit as effective in the environments of those days. Relational and hierarchical systems were commonplace and icon-driven to boot. Image and facsimile processing prevailed, instead of today's linguistic metaphor. These systems provided the kind of realism to data that we've been trying to recapture ever since those days; these left little need for the kind of lengthy dissertations that consume so much of our time in communicating or receiving today's data.

The widest variety of user languages existed. These included both natural and artificial dialects, allowing as efficient an employment of data processing languages as we experience today. Even special languages for applications-specific environments were available. Mathematics, logic and business dialects existed, to name but a few. Encryption was commonplace, and all languages were about as user-friendly as any found these days, all things considered.

Systems were engineered to be air- or water-cooled when nature could not perform the job. Streams of water were diverted to handle the most difficult coolings as were channels in rock carved to catch the breeze for those subject to overheating.

See **BREAK** page 68

Lecht is chairman of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.

What price talent?



HUMAN CONNECTION
Jack Stone

A few weeks ago, I was introduced to one of the younger members of our august profession who was hardly dry between the ears when measured by her chronological age, but a woman of great wisdom when viewed in terms of education (computer science honors graduate from an Ivy League university) and experience (10 years large-scale systems programming). She had some fascinating things to say about her career.

"I really enjoy the systems programming work, mainly because the software technology comes easily to me, and I am able to attack new problems quickly and effectively. My facility, I guess, must be a native one because it sure didn't come from my academic background as one might normally expect. At my university, the education was highly theoretical and of no significant practical value. And I feel I know something about the business: For example, a short while ago, I was asked to develop a specialized operating system from scratch to meet the complex needs of some researchers. I've also handled the full gamut of tasks, all the way from operating system modifications and extensions to dealing with the top-level operating system professionals from the machine vendor's organization."

Dropped a bomb

Then she dropped this bomb.

"It's a shame I had to give it up. The truth of the matter is that there was nowhere for me to go in systems programming. I was locked in on two counts: First, my boss felt I was too young and inexperienced to handle a significant management assignment, a conclusion I strongly disagreed with because I had been handling small groups on a project basis for about five years. Second, I had topped out of my salary bracket — $40,000 per year — and unless there was a change in policy or an exception was made, more increases for me were not possible.

"I really loved the company and all my associates, and they expressed the same about me and didn't want me to go, but I had no choice. What was worse was that from everything I learned about the employment situation, I really couldn't expect things to be much different in other organizations. So, most reluctantly, I felt forced out of my profession and had to take a job in systems support with a marketing organization in order to improve prospects for my future growth. The challenges I have to face are perfunctory compared with those in my earlier work, but the financial and supervisory opportunities are much brighter. Sure, I may top out in marketing, but if I do, it will be at six figures, and even then, I'll have a shot at a top management position and the golden ring."

Of course, the issue presented here is an age-old one, namely, what must a firm pay to retain its high-quality performers, and at what point must the leadership put its foot down hard on the deck and say, "You're a fine person and a valuable member of the staff, but you've priced yourself out of the market." The answer lies, of course, somewhere in the supply and demand curves for professional staff. A trainee who sits up on his high horse and demands an exorbitant salary is shown to the front door, pronto. But a highly qualified and responsible, perhaps gifted, person — as my interviewee appeared to be — is another matter. She presumably was a prized employee, very difficult to replace, and my guess is that her former employers are still suffering the loss.

There's no pat answer, that's for sure. Every firm justifiably hates to see their good people leave, but only a few can afford to extend salary ranges because, as a matter of parity, if it's done for one, it must be applied to others. Such action is rarely feasible in our business — computer centers are not the Dallas Cowboys organization which, it is rumored, caved in to holdout player Randy White with a seven-figure contract, irrespective of the consequences for the rest of the team. ‡

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

BREAK from page 67

If we, today, envision these ancient data processing systems as the exceptionally weird creations of a mankind not yet cooked long enough to have made much else, I cannot help but disagree and wonder how tomorrow's modern man will envision ours. As I gaze from my window some 300 feet above Manhattan's paved world and see the Chrysler Corp., Empire State, IBM, AT&T, McGraw-Hill Co. and Sperry Corp. towers, I envision these as massive computer systems and cannot help but wonder whether anything has really changed from those days.

True, it appears as though the tools in the hands of today's industrial kings and captains of industry have changed, and the forms of such massive data processing systems have changed as well.

If we, today, envision these ancient data processing systems as the exceptionally weird creations of a mankind not yet cooked long enough to have made much else, I cannot help but wonder how tomorrow's modern man will envision ours. As I gaze from my window some 300 feet above Manhattan's paved world, I envision those skyscrapers as massive computer systems and cannot help but wonder whether anything has really changed from those days.

Once only tens of feet high and sprawled over thousands of acres, these systems are now reaching thousands of feet in height and are sprawling over only tens of acres. But I suspect that their volumes of productivity may well be the same. And when today's systems are to be written about by a future chronicler some 1,000 years hence, all that I've said of those a 1,000 years thence may well apply.

Similarly entrapped

Like all the creatures to which we attribute an endemic inability to escape their continuous re-creation of a fixed pattern — the nightingale, the thrush, the whale, mouse, ant and spider — to me, we appear similarly entrapped.

We seem unable to escape the re-creation of past data processing systems' forms, however we may wish to, and for the life of us, we are unable to understand why. If we could find a way out, we would; but by all current indications, that is all but one which I think I see, we won't.

And what is the way? The Lord said to Job: "Gird up thy loins like a man. . . . Thine own right arm may save thee." Maybe He wanted Job to make something that, in fact, would do what a man could do. To place it in his stead so that he could escape participation in re-creation of the massive repositories of power, which Job and we could not help making, to hold us until His coming.

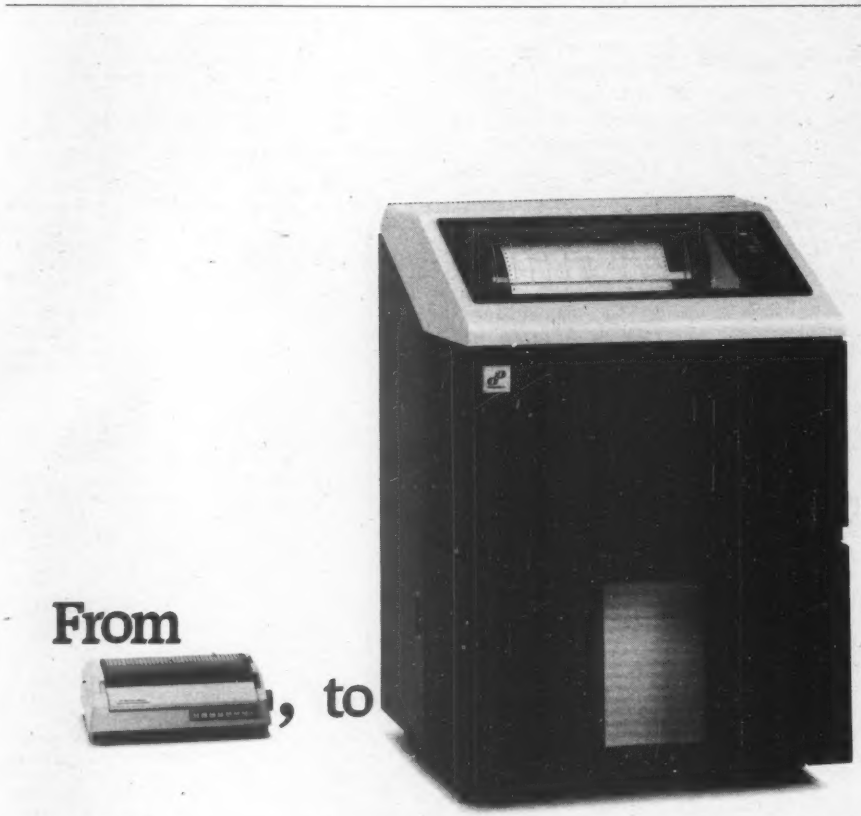
Meet him halfway

Maybe He wanted us to meet Him halfway so He would not have to travel so far to get here.

I believe we may be on our way to doing this today as our electronic systems start to mirror man himself. First, we made its constituent parts: processor, memory and I/O.

Then we made the cables we needed to tie a lot of these together into early versions of local-area networks, the kind that grace man's nature, the neuronal networks that nourish the brain's ideational world and the systems that nourish his physical body. Now we are busily creating speech synthesizers, feelers, audio and visual amplifiers, tasters and whatever. True, these must, even in this day of micro miniaturization, sprawl over an area far greater than does a single man, but who knows what the future may hold?

It appears like we're on our way to making a creature not too dissimilar to ourselves — in function at least. And while it's my point of view that we may never make a real honest-to-goodness human being, maybe we can come close enough to making the kind that likes to inhabit castles and office buildings, pushing paper and doing all the things that are needed to keep these places going. And when this is accomplished, might we not extricate ourselves from these so we can rest a bit and then address the problem of how to escape their need altogether?



From , to

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IN DEPTH

TECHNO-BANDITS



How the USSR steals U.S. high technology

***This week: stories of intrigue in the tech trade. Here are superbandit millionaire Richard Muller and software deal-maker Marc De Geyter. Put yourself in the place of the Soviets — when you need to upgrade an American-made military computer used for spying, what would you do? Send it back to the U.S., of course. Coming in In Depth: an interview with the authors of* Techno-Bandits.**

Charles J. McVey Jr. may have looked like a middle-America stereotype, but his deepest interests lay in Communist Russia. He had reportedly made a satisfactory and profitable deal for two IBM 370/145 mainframes.

It was said that McVey had bought them on the used-computer market in West Germany, shipped them to Switzerland and then sent them on to the Soviet Union. He had avoided the tedious and obstructive procedure of trying to get validated licenses from the U.S. Department of Commerce.

McVey had just returned from Moscow. He was about to fulfill the next clause in the contract, which was to arrange for Russian computer people to get training courses in the use of IBM software.

The seminars included introductions to the OS/VS1 and VS2 operating systems and programming Vsam. There were introductions to TSO and CSM. Also included were courses relating to the design and programming of the IBM 370 3704 and 3705 communications controllers and APL.

McVey had put great emphasis on the importance of the software involved in his deal with the Russians. There was a clear implication that he had not been able to buy in West Germany all of the software [the Russians] wanted. One such

(Adapted from Techno-Bandits *by Linda Melvern, David Hebditch and Nick Anning, published by Houghton Mifflin Co., Boston. Copyright © 1984 by Linda Melvern, Nick Anning and David Hebditch. Reprinted by permission of the publishers.)*

At the time, the IBM package was of such poor quality that giving it to the Russians could be interpreted as an act of sabotage against the USSR.

package was IBM's IMS, or Information Management System.

A British computer consultant who declined to get involved in McVey's Minsk seminars met on Feb. 23, 1977 in the coffee shop of the Heathrow Hotel with a Belgian named Andre Marc de Geyter. De Geyter had just flown in from New York, and his briefcase bore the distinctive blue and white baggage tags from the Concorde flight.

The consultant had not been told beforehand the purpose of the meeting, but de Geyter wasted no time in coming to the point. "I hear you have quite a few clients who are IBM users." The consultant looked up from the menu and nodded. "Look, I do a lot of business in Russia. I need a copy of the standard distribution tape for IMS, no matter which version. Do you think you could get one for me?"

The consultant shrugged. "Why not get it direct from IBM?" Then he was immediately struck with the naivete of his question. That was the last thing de Geyter would want to do. On the other hand, though software tapes are sometimes copied from one company to another to avoid the substantial license fees, that is almost never done among IBM customers. The larger companies tend to be honest in this regard, and in any case, none would want to risk discovery by IBM. The consultant's curiosity was aroused. "How much are they prepared to pay?"

"Whatever. I suppose something like $20,000."

"How much of that would be for me?"

"All of it."

The consultant needed a little time to think, so he turned the conversation to de Geyter's business with the Soviet bloc customers. The Belgian talked freely but revealed very little. He said that he'd been in the USSR a good deal over the past year, about one week in every month. He had an office in Moscow with telephone and Telex numbers. He also traveled a lot in the U.S. Eventually, he came back to the IMS tapes.

"Do you think you could do that for me? If necessary, I suppose we might come up with as much as $30,000."

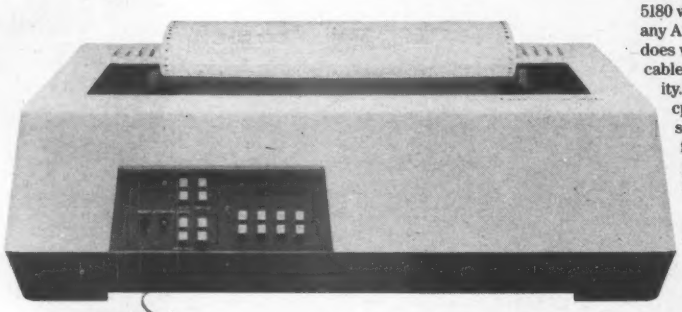
Now the consultant was sure that he was being asked to steal the tape. The $20,000 would not be enough to induce a company to make an illicit copy. The options seemed to be two: either steal the backup copy from a company or bribe a computer operator to steal one, perhaps during a night shift. Neither was hard to do; the main risk would be approaching the wrong person. In all of this, Marc de Geyter would be in the least danger, because he would undoubtedly be far away from the action.

What about the national security implications? The consultant thought about that and almost began to laugh. At the time, the IBM package was of such poor quality that giving it to the Russians could be interpreted as an act of sabotage against the USSR. It was so slow in operation that for critical military functions it might even be a liability.

In the end, the consultant was noncommital, saying he'd think the offer over. He did not hear from de Geyter again.

The Scientific Research Institute for Electronic Computers [at Minsk] did eventually get its copy of the tape. De Geyter was able to buy it — along with other IBM software packages — from John English and his partner, who ran a computer services firm. [English taught McVey's courses in Minsk beginning in May 1977.]

Your IBM 34/36/38 Will Think This Is A $17,000 Printer.

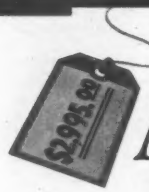


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This deal displays some of the queer paradoxes of the whole techno-bandit trade. De Geyter told English and his partner that he wanted "public domain" material only — that is, out-of-date software that IBM was no longer interested in supporting. This he was going to sell in India. The partners thereupon made a call and learned from IBM that it had no objections. In fact, IBM considered that such a deal might even pave the way for more IBM computer use in India.

After some time, English's partner discovered that the tapes he was sending to Bombay were being forwarded immediately to Moscow and Minsk. At this, he refused to have anything more to do with de Geyter. De Geyter still owes him $20,000.

The Belgian's financial standing must have improved by 1979, however, when he surfaced again with a $150,000 offer for some software. Software AG of North America, Inc. is the marketing arm of a West German firm that develops high-quality systems software for IBM computers. One such product is Adabas, a data base management system often considered superior to IMS. Development costs for Adabas are estimated to have been some $10 million, and a license to use it costs about $125,000.

Jim Addis was the senior technical specialist in Adabas, and he worked at the company's Reston, Va., headquarters. On May 21, 1979, he had a call from de Geyter, who said that he wanted to discuss some software matters and would Addis meet him for cocktails at the Sheraton Hotel? Addis agreed.

After the first drink, de Geyter began to talk about what he really had in mind. He had been retained by the Soviets, he said, to obtain a copy of the program source code for Adabas, and he would be willing to pay Addis $150,000 for a tape. Jim Addis nodded and said that he'd consider the matter.

The implications were obvious. The source code was not normally sold, because it gave access to all the design secrets of the package. For $150,000, the Russians would get a shortcut to $10 million worth of development.

The following morning, Addis reported the conversations to his boss, John Maguire, president of Software AG of North America. Maguire called the FBI.

When de Geyter called again, on May 24, Addis told him that Maguire was interested and wanted to talk with de Geyter directly about the offer. After several postponements and telephone conversations between the Belgian and Maguire, the two finally met face to face at the Washington National Airport on July 20.

Again, de Geyter laid all his cards on the table. The Russians wanted the source code and were willing to pay $150,000. "Want a check in Zurich?" asked de Geyter. "You got it. I couldn't care less. It's a one-shot. No paper; no contract."

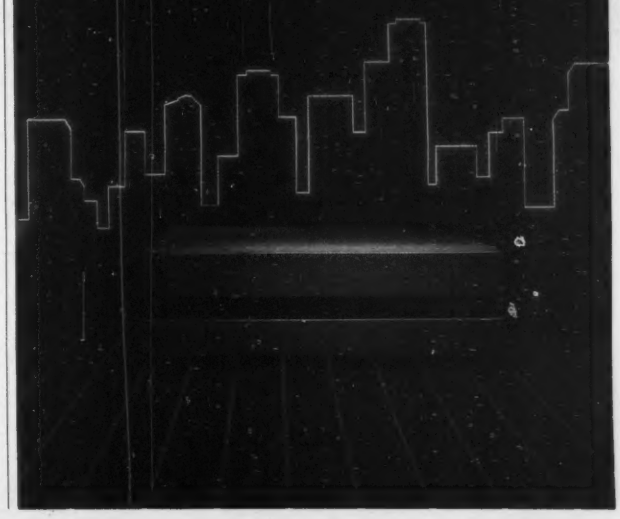
Maguire said he was worried that the source code might get leaked to Software AG's competitors in America and Europe. No problem, said de Geyter; it would go to the Soviets and nowhere else. He said he'd call Maguire as soon as everything was worked out, and the men shook hands.

Maguire had, of course, been wired, and the FBI listened to the recording of the airport conversation with considerable interest.

When de Geyter called again, on Aug. 7, he proposed that Maguire fly to Brussels with the tape. There it would be verified at

Maguire was still playing a canny game, and he asked whether exporting software without a license was legal. De Geyter said that it was. Maguire said that he'd like to verify that with the Commerce and State departments.

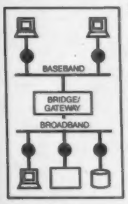
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a Belgian computer facility. Payment would be made in Zurich.

Maguire balked at this. He said that he wanted payment in cash, in the U.S.

De Geyter said that he didn't carry large sums of cash for fear of Customs searches.

"If you're worried about cash, what if they catch you with the code? Do you know about export licensing?" Maguire asked. He was doing an excellent impersonation of a tempted but worried man.

De Geyter was nonchalant. "I'll take the whole responsibility. You're not supposed to know where it goes to and what I'm going to do with it."

As negotiations dragged along, Maguire began to play hard to get. And the more reluctant he got, the more de Geyter raised the ante — to $200,000 and then to a quarter of a million. He even offered to throw in some California real estate. But the matter of the payment was nonnegotiable — no cash. The money would have to be transferred to a Swiss bank account.

There were more telephone calls, but the two men did not meet again until Oct. 3, when they had breakfast at the Reston Sheraton. De Geyter said that he was going to make the stakes richer — the Russians had authorized him to increase the offer to $450,000. If Maguire wanted that verified, he could talk directly with an official of Techmashimport at the Soviet embassy.

Maguire was still playing a canny game, and he asked whether exporting software without a license was legal. De Geyter said that it was. Maguire said that he'd like to verify that with Commerce and State.

This kind of talk made de Geyter distinctly nervous. He replied that he could overcome any objections and legitimate the deal by having one of his own California companies licensed to use the Adabas package. But again, the transaction must not take place in the U.S., because the tape would have to be verified by a Soviet programmer in Brussels.

Maguire said that he hadn't changed his mind: He would not fly to Europe and he wanted cash only.

"Look, I'm taking all the risks, and I do not want to go to jail," said de Geyter. He pleaded that if he lost his deal, he might lose millions of dollars in Soviet business. He was sure that if he failed, the Soviets would just get the tape somewhere else.

On Feb. 4, 1980, there was a knock at the door of Marc de Geyter's room in the Sheraton City Squire Hotel in New York. The two men in the hallway showed their FBI identifications and asked to interview him regarding allegations that he was acting as an agent of the Soviet Union without having registered with the Attorney General.

He asked them in. Completely deflated, he sat down and told them everything — at least, the de Geyter version of everything.

Marc de Geyter's career in techno-banditry has a number of things that are more or less typical of many other men's stories. He combined sufficient knowledge of computer technology with a manipulative instinct and a flexible morality. It could be said that he was just a bit too clumsy at playing the clandestine game. But, on the other hand, it could also be said that more often than not, he landed on his feet after a fall.

His version of the Adabas attempt was, at first, fairly simple. The Techmashimport representative had approached him in February 1979. De Geyter had not

It could be said that Marc de Geyter was just a bit too clumsy at playing the clandestine game. But, on the other hand, it could also be said that more often than not, he landed on his feet after a fall.



Compared to this, other 3278/79 emulators aren't much to look at.

De Geyter, with a broad smile, reached into an inside pocket, produced a check and extended it toward Klund. The check was accepted by an FBI man who moved in just at that point.

been offered any sum of money nor had he offered Maguire any. The Belgian said that he was just a go-between; if the deal succeeded, he would expect to get a 15% commission. Maguire would have to handle the application for a Commerce Department license for the sale.

It was not a very good try. The agents came back the next day with questions that were rather more pressing. Under their interrogation, de Geyter grew progressively more truthful. He acknowledged increasing the offers to Maguire, and he admitted holding a Russian letter of credit for $450,000. He also confirmed that Maguire had raised the export license question — but then he insisted that Maguire had taken the responsibility for following up on that, because Maguire had a contact in the State Department.

De Geyter must have been astonished that the FBI did not arrest him. From his point of view, the interrogation had been unsettling but salutary — it warned him that he had to change his tactics and that he had to move fast. Now was the time to get to work on his alternative route to the software.

The next morning, he put in a call to Charles Matheny. Matheny was the board chairman of a company called Centex, which, not coincidentally, had its offices in the same Reston building as those of Software AG. Not that de Geyter wanted to be seen in Reston again right away — so he asked Matheny to meet him at the National Airport the following morning, Feb. 7.

As Matheny drove from National to a hotel, de Geyter described a deal he was putting together for a Saudi sheikh who headed an Arab bank. The bank wanted to install a massive computer system for accounting and administration, and de Geyter was putting together a team of technical specialists for the work. One of the software packages the Arabs wanted was Adabas, and de Geyter was willing to pay Matheny a $25,000 finder's fee in cash for an introduction to somebody in Software AG who could obtain the source code and other software — as much as possible. Matheny was supposed to keep a low profile and under no circumstances let Maguire or Addis know about the deal. Matheny answered that all of it might be feasible. He would explore.

When de Geyter phoned again, on Feb. 21, he said that the Arabs were putting on the pressure and he needed an introduction as soon as possible. Matheny had good news. An employee of Software AG had agreed to talk it over with de Geyter.

On April 16, 1980, de Geyter was back in Virginia, this time at the Holiday Inn in Rosslyn, and a rather unenthusiastic man named Timothy B. Klund came to see him. When Klund heard the requirement, he said that stealing the source code might lose him his job. He was somewhat interested, but there were a lot of risks involved . . . De Geyter used all his powers of persuasion to induce Klund to meet him once more, at the airport just before de Geyter was to leave for Europe. He raised the ante to $250,000; Klund countered with an asking price of $500,000, to be handed over in the U.S. A frustrated but unbeaten de Geyter went off to catch his plane.

He called Matheny on April 24 to say that he was buying Klund an air ticket to Europe. He then went to Vienna, Moscow and back to Brussels. On May 15, he called Matheny again to say that he was arriving in New York the following day with



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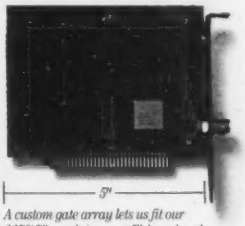
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a check for Klund. Matheny reminded him that Klund would take cash only. De Geyter rang off, then called back later to say that he now had the cash and that Klund was to meet him at JFK International Airport.

Klund was on time to meet the Brussels flight, and as soon as the two men could find a secluded spot, he produced the tapes. At long last this deal was going to be closed. De Geyter, with a broad smile, reached into an inside pocket, produced a check, and extended it toward Klund. The check was accepted by an FBI man who moved in just at that point.

De Geyter's sad fate had been to strike a heavy deposit of honesty and patriotism in Reston, Va. Like Maguire's before, Matheny's first reaction to de Geyter's approach on Feb. 6 had been to call the FBI.

Pleading guilty to the lesser charges, de Geyter got off lightly: He was fined $500 and made to pay a civil penalty of $10,000, and he served a four-month sentence in a federal correctional institution in Petersburg, Va.

Timothy Klund was an FBI agent.

One other striking thing was the high quality of the role-playing by three amateur actors. Each one had assumed, with great conviction, the part of a character in whose mind greed was contending with fear and thus breeding procrastination. They might have come straight from an Eric Ambler novel.

The most fascinating document in de Geyter's possession was what may well have been one of the few Soviet shopping lists of high tech ever to fall into Western hands.

It consisted of a single page listing 10 items. The first was Adabas. The last was Ada Basics V.4.1. Ada would be used, for example, to program the navigation and control systems of guided missiles. There is nothing very secret about the structure and syntax of the language, but the Defense Department would be very unhappy to learn that the Russians were in contact with any of the working compilers.

The accused was charged with "interstate and foreign travel in aid of an unlawful activity"; that is, commercial bribery, in violation of the laws of the State of New York and the Commonwealth of Virginia. De Geyter's lawyer managed to get the $500,000 bail reduced to $100,000 — over the objections of Theodore S. Greenberg, the assistant U.S. district attorney. The eventual public recounting of this part of the story came in Greenberg's testimony before a Senate committee in April 1982.

Pleading guilty to the lesser charges of violating the Export Administration Act and the Virginia commercial bribery statute, de Geyter got off lightly: He was fined $500 and made to pay a civil penalty of $10,000, and he served a four-month sentence in a federal correctional institution in Petersburg, Va.

Greenberg was asked at the hearing why the charge was switched from felony to misdemeanor and answered that there were government considerations that he could tell the committee only in closed session. But de Geyter's lawyer had included a statement in the "Defendant's Sentencing Memorandum" to the effect that the government had simply accepted his client's plea of guilty to the two misdemeanors and that "Mr. de Geyter is not and has not agreed to become a spy or agent for the U.S., Belgium or any other foreign power."

Sen. William Cohen of Maine pointed out that a man in Washington was facing a fine of $1,000 and a year in jail for stealing a tire from a car, yet surely his crime represented "a different level of threat to our society." How could de Geyter's sentence act as a deterrent?

All Greenberg could reply was that "there were interests which required us to dispose of this case other than through a trial." Sen. Cohen acknowledged that the prosecution, in such a case, may fear disclosure of the methods it used in acquiring its information. But the situation was hardly clarified when de Geyter's attorney, told about the senator's remarks later, said, "It was more a question of government sloppiness than plea bargaining. The case was overblown to begin with."

On Aug. 1, 1980, the Department of Commerce sent a standard form letter to Marc de Geyter, warning him that it was considering the issuance of a denial order against him. He did not reply, and no further action was taken. This means that de Geyter can still buy all the technology he wants from sellers in the U.S.

In fact, the Russians did not readily take no for an answer in their efforts to get Adabas from Software AG. In 1981, less than a year after de Geyter served his jail sentence, a Russian approached the company's staff at two trade shows in the Washington area. His name was Georgy V. Veremey, and he was from the Soviet embassy. His interest was far from casual; on Sept. 25 he turned up unannounced at the Reston office. In speaking to Software AG executive Sunday Lewis, he made no secret of who he was and what he was looking for. He wanted a complete list of all the firm's products and the available supporting documentation. He left with the list



A look at some of the issues involved

One part of mankind is striving to prevent another part of mankind from sharing in the marvels of invention we have brought about in the late years of our century. The objectives are clear, but the motives are mixed, perhaps, and more obscure. The West submits: the Communist East has been controlled by an aggressive tyranny for 60 years or so; to sell it the technology we have developed is to arm it even more dangerously against us. It is like the wagon train selling repeating rifles to the Sioux.

The more obscure motive is a product of pride, a pride that says Europe, Japan and the U.S. have again proved the superiority of their intelligence. Why should we disperse our technological riches among nations that have not earned them and will not share them with their peoples?

The counterarguments come best in the form of questions: In a free society with an open market, how can ideas or the products of ideas be denied to another part of the world? Shouldn't technological leadership rest on a constant striving for invention and discovery rather than on hoarding what is produced?

Probably the largest question is this: Can an open society put limits on the free exchange of knowledge and still remain an open society?

• • •

When the Departments of Defense and Commerce and the intelligence community formulated proposals for firmer controls over the publication of unclassified information, the result was a storm of protest in the world of science. The government rebuttal was put by Dr. Jack Vorona, director of Scientific and Technical Information in the Defense Intelligence Agency.

In testimony before a congressional committee in May 1982, he said he knew that the Soviets have received every one of the 80,000 government reports lodged with the National Technical Information Service of the Commerce Department — and 75% of those papers were from the Pentagon, the Department of Energy and the National Aeronautics and Space Administration.

Arthur Van Cook, director of Information Security at the Department of Defense, was even more dramatic in his testimony. He spoke of "this hemorrhage of information to hostile nations" and gave an FBI estimate that as much as 90% of Soviet collection requirements could be satisfied through open sources — and by the efforts of the several thousand Soviet technology collection officers now at work.

• • •

America had had a good run of some 20 years as the high-tech supplier to the world. But in the 1980s, the Japanese, particularly, were becoming very aggressive competitors. The tougher new export controls began to pinch American exporters, and they complained. The paradox in this, of course, is that a lot of the control enforcement rests on the cooperation and goodwill of industry.

Predictably, the great issue was the definition of "dual use." Many things, from the simplest to the most complex, can have both a peaceful use and a war use.

• • •

There is a true story of a wonderful example of this particular enigma. In April 1982, customs agents at JFK International Airport seized a Bell Laboratories crate destined for Moscow. The Commerce Department ruled that the cargo was "militarily significant" and could not go out.

After the Polish diplomats left the store, an FBI agent learned from the store clerk that they had bought a number of Tandy Color Computers — and had used their diplomatic passports to get the sales tax waived.

The very disgrunted Bell Labs scientist who was accompanying the shipment protested, "That thing plays chess. That's all." Inside the crate was a machine called Belle, a master class chess-playing whiz. Kenneth Thompson was taking it to Moscow for a chess tournament. The only way the computer could have a military application, Thompson remarked, was to drop it out of an airplane. "You might kill somebody that way," he said.

• • •

In the summer of 1983, FBI agents were following some Polish diplomats who had just left their embassy on 16th Street. The Poles walked *en bloc* to the Radio Shack store on 15th Street and stayed awhile. After they left, an FBI agent learned from the store clerk that they had bought a number of Tandy Color Computers — and had used their diplomatic passports to get the sales tax waived.

• • •

The fact that causes perhaps the greatest anguish to honest men in government and business is that techno-bandits rarely suffer more than some inconvenience after they've been exposed. Muller and McVey appear to be beyond the reach of American justice — on a list that gets longer with almost every new transfer scandal. All are rich men living in luxury with only one annoyance: They cannot enter the U.S.

There is a well-recognized principle of international law that provides that a state refusing to extradite a certain criminal should proceed to punish him according to the equivalent local laws. Many international conventions contain such clauses. But these conventions deal with universally recognized crimes, and they do not apply to U.S. export control legislation. In any case, there are no more than civil penalties for breaking economic laws.

• • •

Commerce's control list remains an 800-page book with more than 200,000 items listed. The Department of Defense's military critical technologies list is reputed to be even larger.

There is some relaxation, nevertheless — and it comes in a rather odd quarter, in view of the U.S.' Coordinating Committee for Multilateral Export Controls quarrels with the British back in the 1950s. Washington is being very kind to Beijing. On July 8, 1981, the Department of Commerce issued a press release announcing a liberalization of its trade policy with the People's Republic of China, specifically in regard to dual-use high technology.

The whole subject of controls is, therefore, both a philosophical and procedural confusion.

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These are questions on which the U.S. and its Western allies should have a strategic and tactical agreement. What short-range controls do we really need? What relaxation is likely to contribute to a beneficial social transformation of the Communist bloc?

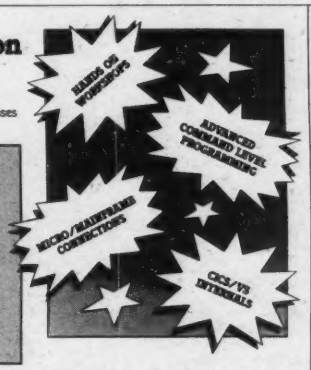
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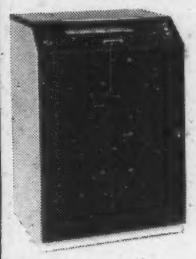
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and an order form.

Lewis reported the approach to her boss, John Maguire. He said that it was company policy not to sell to the USSR and reminded her that export licenses would be needed from the Department of Commerce in any case. Veremey returned on Oct. 2. When the receptionist told him that Lewis was out to lunch, he said he did not mind waiting and was invited to take a seat. But he did not remain stationary for long and began to wander in and out of the offices. The receptionist insisted that he be seated. When Lewis arrived, the Russian gave her a completed order form for a full set of manuals and other documentation valued at $400. Lewis said that she could not fill the order because the sale would have to be licensed by a government agency. Veremey laughed and said, "What license was issued for the U.S.-USSR wheat deal?" But he left empty-handed. Software AG did not see him again.

* * *

Born in Giessubl, West Germany, in April 1942, Richard Jurgen Muller would, from his outward appearance, be regarded as a personification of the postwar German economic miracle. Muller is a millionaire who rose almost from nowhere. He has been known to the American and West German authorities since 1974, but neither country is able to furnish much detail about his personal background. Friends and employees stress his consideration for his business associates and generosity with his money, but he guards his activities by spreading them across several continents and many companies.

The American authorities believe Muller to be responsible, in all, for tens of millions of dollars' worth of technology illegally shipped to the Eastern bloc. They claim to have identified up to 60 front companies through which he has operated.

Muller had built his impressive fortune by being one of the first and most enterprising techno-bandits. The U.S. enforcement agencies learned of his activities when he was involved with an employee of the German subsidiary of Honeywell in using the company's name to try to obtain embargoed technology for shipment to the Eastern bloc. The employee was caught by the West Germans and appeared in court in Stuttgart, accused of offenses causing damage to the nation's security. He was sentenced to four years in prison. Muller was neither charged nor convicted. Evading arrest was to become a Muller trademark.

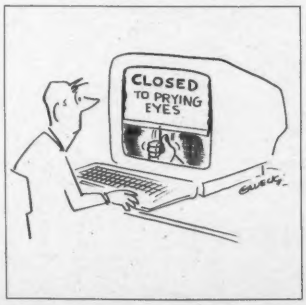
Less than a year later, Muller masterminded one of the best-known technology-transfer cases, involving Gerald Starek's company, II Industries, Inc. (Triple I). Although a warrant was issued for the arrest of the absent Muller when the case broke, he evaded U.S. authorities.

In 1975, when the Triple I deal was being put together, Muller was involved in yet another scheme. He had managed to persuade the owner of a small West German company to order semiconductor-manufacturing equipment from U.S. firms. He had described himself as an original equipment manufacturer who put together items from different sources to make up complete custom-built systems. This scheme resulted in the shipment to Technopromimport in Moscow of three consignments that, together, made up a semiconductor-manufacturing plant.

The Commerce Department in Washington found out about the shipments too late. On Sept. 21, 1976, U.S. consular officials interviewed the Muller contact, who denied any involvement. But Commerce persisted with its inquiries, and denial orders were issued in Aug. 1981 — five years after the shipments had reached Moscow. Muller is estimated to have made $2 million from the deal.

The American authorities believe Muller to be responsible, in all, for tens of millions of dollars' worth of technology illegally shipped to the Eastern bloc. They claim to have identified up to 60 front companies through which he has operated.

[In one of the most publicized incidents, last November, customs agents in West Germany and Sweden seized equipment apparently bound for the Soviet Union.] This case was considered so important that a Washington press conference was called. The seized equipment was to be displayed; Defense Secretary Caspar Weinberger and Treasury Secretary Donald Regan were to attend. The conference was a golden opportunity for publicizing Operation Exodus and for reinforcing the U.S.



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government's contention that crucial technology was still being shipped to the Soviets.

The first journalists to arrive at the main Treasury building on 15th Street took seats right in front of Richard Mulier's VAX-11/782. The latecomers had to stand behind the platform that the maintenance staff had constructed for the television cameras. As the cameras would see it, the central processor and the magnetic tape units were directly in front; a 300-megabyte disk drive, two Tektronix, Inc. graphics displays and two Digital Equipment Corp. VT-180 terminals were positioned to the left. To the right of the central processor was a speaker's rostrum; behind that, chairs for the VIPs. Tables showed various circuit boards and manuals bearing the logo of Systems Industries, Inc., and display panels showed photographs of the scenes at Andrews Air Force Base when the system arrived back from Germany on a massive USAF C-141 cargo plan.

Secretary Weinberger told the assembled reporters that the VAX could have helped the Soviets increase the accuracy of their missiles. All of the equipment display was totally embargoed to the Eastern bloc, and the seizures had been "much too close a call." He said the Pentagon wanted to review license applications, such as those granted for these shipments, but had not been allowed to. They were West-West cases. Had Defense been involved, the licenses would never have been granted.

Twelve journalists later attended a background briefing at the Pentagon. They were told that as many as three VAX-11/782 systems were believed to have been involved in the shipment from South Africa to Europe. The officials also suggested that the consignment may have included 11 small computers.

It was their best guess that the Soviets wanted to use a lot of this equipment to produce integrated circuits for the military. Something on the scale of a large microchip factory would have been possible. The resulting chips would have made Soviet weapons smarter, given them improved targeting and made them more effective in avoiding countermeasures. The look-down targeting radar of the F-15 fighter included 4,778 MSI chips. The average failure rate was one every hundred hours. The Americans estimated that by 1990 they could reduce the number of chips to 41 and, at the same time, bring the failure rate down to one every 10,000 hours. This was what the Soviets wanted to be able to do, but they were still 15 years behind the U.S. in this field. The Pentagon wanted to keep it that way.

The Defense officials said that the main weakness of the Soviet Union was not in research and development but in producing adequate quantities of the chips. As many as 12 to 15 of the country's integrated-circuit production lines had been bought or stolen from the West.

The Muller case had confirmed a Pentagon belief that the Soviet Union was determined to import as many VAX machines as possible. Although not really compatible with its 16-bit predecessor, the PDP-11, this 32-bit machine does have a lot of storage and peripheral devices in common with the older systems.

At this time, many other VAXs were being shipped to the East by rings allegedly operated by Brian Williamson in the UK and by another Englishman, Alan Simmons, in Greece.

Although Digital would argue to the contrary, the VAX system is not state-of-the-art for that type of processor. It is, however, well established and supported extensively by DEC and by many suppliers of alternative peripherals and software. The Soviet Union cannot yet make the advanced very large-scale integration (VLSI) chips needed to construct an equivalent computer or the essential flow of spares. But apparently the Soviets needed the VAXs for certain essential applications in the short term — and thus they ignored the long-term problems.

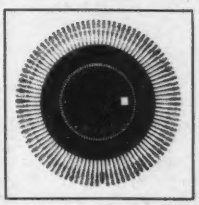
The power and capacity of the VAX makes it suitable for a wide variety of applications — commercial, academic and military. Its strong points include communications — it can be used as the switching node in networks — and for graphics and computer-aided design. Although it is not built specifically for graphics applications, it can do the job well enough, and its software library contains many programs for specialized tasks. The machine is so versatile that it could be used for the design of microchips, and the same

It was their best guess that the Soviets wanted to use a lot of this equipment to produce integrated circuits for the military. Something on the scale of a large microchip factory would have been possible.

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hardware could be used to set up a new military communications network.

• • •

Connoisseurs of these matters consider the Joyce Loebl case the classic comedy of errors in control history. It is an excellent example of the "American component" controversy.

Joyce Loebl is not a lady but a subsidiary of the major British military contractor, Vickers. In August 1982, U.S. network news reported that Joyce Loebl had mysteriously shipped an American-made military computer to the Soviets, who were using it to spy on the U.S. When the Soviets decided to upgrade the system, the report continued, they shipped it back to its manufacturer in Pasadena for modification. The Russians seemed to expect it back again after that — which was, according to Commerce officials, "either unbelievably dumb or incredibly brazen." The British were simply accused of bad faith and double-dealing.

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That set off an angry debate: The Americans included a slide of the equipment in the CIA traveling dog-and-pony show, and the British accused their ally of "imperialism." The story had begun with the Joyce Loebl purchase of a Vision 8000 R at a cost of $70,000.

The manufacturer was Comtal, a subsidiary of the giant 3M Corp. and a leading maker of state-of-the-art graphics systems very useful in a range of image-enhancement applications.

Comtal described its technology in an advertisement in *Computer Graphics World* in November 1983:

"Whether you're exploring the outer regions of space or exploring for oil in some remote area of the world, Comtal's new Vision Ten/24 is the only digital processing system that processes and displays . . . high-resolution images with a clarity never experienced before . . . . It's a powerful tool for interpreting and analyzing images for such diverse applications as Landsat, meteorology, seismology, graphic arts, earth resource management, medical imagery . . ."

A California middleman had obtained a Commerce Department license to ship the Vision 8000 R to Joyce Loebl in 1979. The Vickers subsidiary had then incorporated the Comtal equipment into a larger system.

Before the whole system was shipped on to the Institute of Geology in the USSR, Joyce Loebl alleges, the Coordinating Committee for Multilateral Export Controls granted it a "national exception," and the UK licensed the sale.

In any case, either the "dumb" Soviets or the "brazen" Soviets (or perhaps even the guileless Soviets) shipped the Vision 8000 R back to Comtal for upgrading in 1981. A British engineer and a Russian engineer accompanied the shipment. The Russian asked for a three-week course in how to maintain the equipment, and Comtal refused him entry to its building.

The British engineer explained that the equipment had already been used in Russia.

"At that point, we just about dropped our pants," later reported Roy Brugman, international sales manager for Comtal.

Joyce Loebl, on being informed of the situation, at once applied for a license to get the equipment back. The Commerce Department refused. On Aug. 24, 1982, after nine months of deadlock, Commerce officials went to Pasadena and seized the goods.

The British, who had been hoping to keep the affair secret, were astonished at the sudden glare of U.S. publicity.

A Commerce Department official went on television to inform viewers that the Vision 8000 R "would enable [the Russians] to build up their war effort, munitions and military capability."

Ted Wu, head of the Office of Export Enforcement, wrote a congratulatory letter to Comtal. And Ron Hendron of Comtal explained that the original export license was good for British purchase only — certainly not for Russian. More than 200 of the machines had been sold to France, Israel and Britain, but not for use in nuclear facilities and never to the Russians.

But then Hendron added some rather curious remarks.

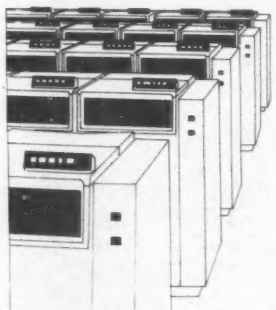
He said about the 8000 R, "This was not our top-of-the-line model. We don't sell it anymore in [that] form." He went on, "In terms of what the Russians got, it was useless without a mainframe to attach it to. It's expensive to maintain and the boards inside are unique. The 8000 series just displays the work of the host computer."‡

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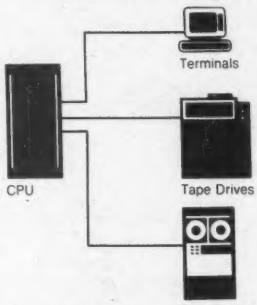
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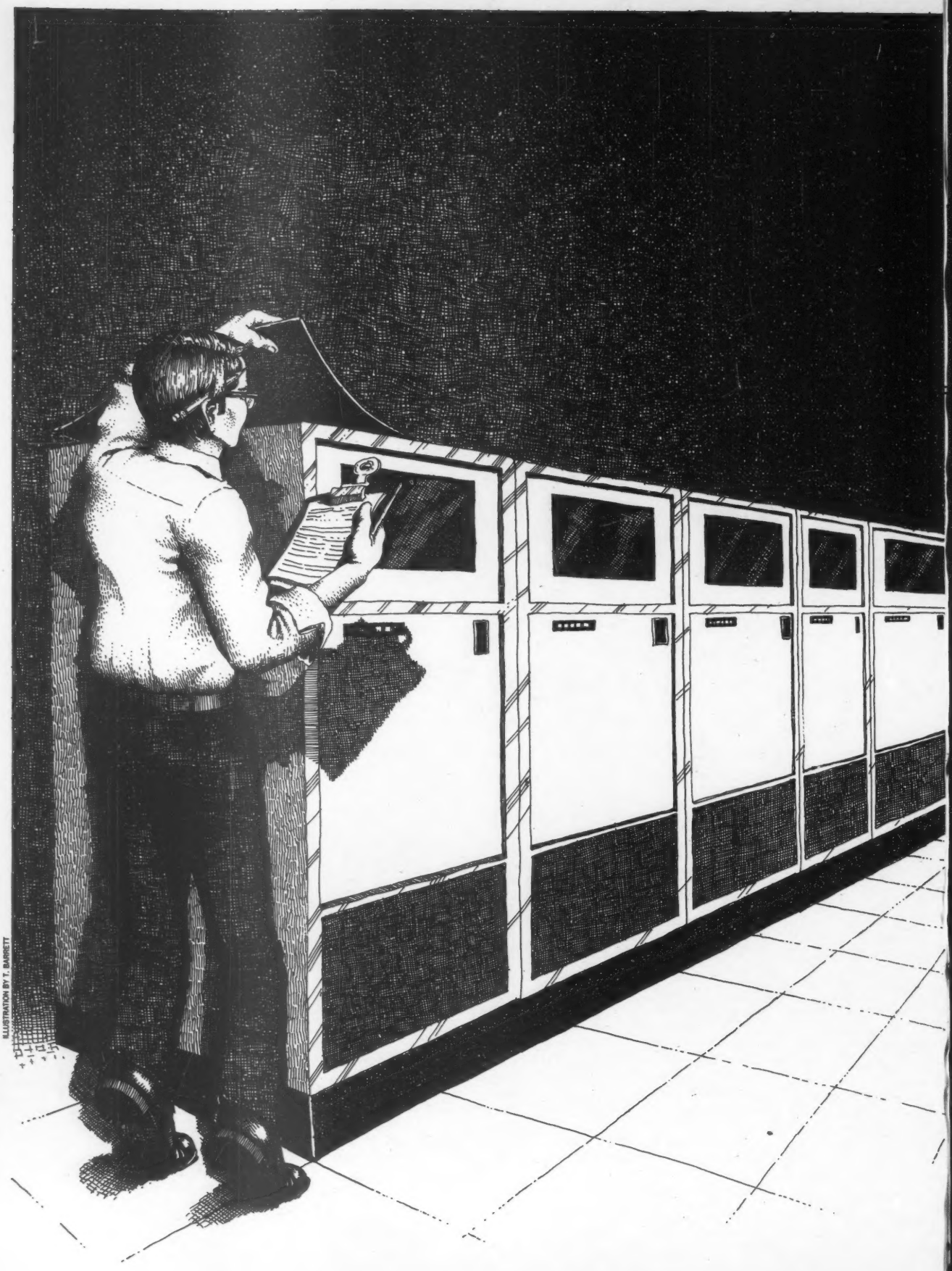


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Surviving (and profiting from) the audit

By Gerald M. Ward and Richard D. Paterson

Auditing is changing rapidly in today's highly computerized environment. New audit approaches designed to test computer-based controls and retrieve information that may be available only in electronic form are being implemented in response to sophisticated accounting and information systems. Auditors now focus on computer-based records as they once focused on manual records and hard-copy audit trails. Little wonder that data processing professionals are dealing with auditors more frequently than in the past.

Don't allow the auditor to submit a report to top management which contains an erroneous assessment of your system.

The cost of maintaining a quality audit program has risen along with the level of DP sophistication. This increasing cost not only reflects escalating salary, training and other costs; it also represents management's increasing commitment to establish and maintain quality computer-based and other control systems. The cost of not implementing sophisticated control systems in today's computerized environment can be substantial.

As with any business matter, there is a cost/benefit decision associated with expansion of the auditing function. Management is concerned with maximizing the benefits derived while controlling total cost.

The MIS director and his department are often the most overlooked organizational resources available to help ensure the quality and effectiveness of the auditing effort. The special skills

(Continued on ID/14)

By John P. Murray

Sooner or later the auditors are certain to appear at the door of the data center. When they arrive, many data center managers overreact.

Often the manager becomes defensive, which serves no purpose. The auditors are going to carry out their assignment regardless of the feelings of the data center manager and his staff. The only practical course is to cooperate.

The arrival of the auditors brings additional demands on what is probably an already burdened staff. However, the contention that data center audits mean at best inconvenience and at worst significant problems is not necessarily correct.

The audit can be a means to bring a sense of urgency to some of the critical data center needs not being met.

There are, of course, poorly managed data centers. In those installations, the audit may — and should — bring poor management practices to light. Finding weaknesses should not necessarily be considered a negative. The audit report can be used as the basis of a plan to improve the data center function. This whole process may be disconcerting, but in the long run everyone benefits.

Even in a well-managed data center, the results of the audit can raise difficult questions and cause discomfort. A generally favorable audit report can produce benefits to management.

The data center manager and his staff must take advantage of the situation. By working with the auditors to help change the audit

(Continued on ID/20)

SURVIVING

(Continued from ID/13)

and experience already present in MIS are assets. They should be drawn upon in building and maintaining the DP audit program.

Although many people — including some auditors — view the monitoring and review effort as solely the auditor's responsibility, this approach is not appropriate if your organization's resources are to be most effectively utilized. Maximizing those resources requires a truly coordinated effort among several departments — especially between MIS and auditing. Obtaining a better understanding of each other's goals and objectives is a good starting point.

A dialogue should be established with the internal audit director to discuss your organization's specific audit objectives and to make sure that your auditors understand the goals you have established for the MIS department.

Responsibility for monitoring

Ultimate responsibility for establishing strong control systems — data processing and otherwise — lies with executive management and the board of directors. The auditing function is a basic feature of the overall control system. It serves to give assurance to management that all other controls are functioning as intended.

For example, management needs to have adequate information to enable it to manage the business. It delegates the responsibility for developing quality information resources to the MIS director. The MIS director is also given the responsibility for instituting the controls necessary to ensure that an organization's information is adequately protected from misuse.

Departments that use data have responsibility for instituting adequate controls at the application level. It is the auditor's responsibility to review the adequacy and effectiveness of all controls put in place so that assurances about the design and effectiveness of those controls can be provided to management.

The goals of the MIS director, the users of data and the auditor are not — or should not — be in conflict. They all share the goal of solid, cost-effective controls. The auditor's motives are not sinister. He does not intend to use the information obtained during the audit against the MIS director. In a healthy environment, both parties should work together to satisfy their mutual goal — making sure that the organization's information is protected from misuse. Other aspects of the auditor's and MIS director's responsibilities are similarly complementary.

Auditor's objectives

The auditor, in attempting to meet responsibilities related to computer-based systems, focuses attention primarily on the following areas: the adequacy of specific application controls; the adequacy of general or pervasive controls (for example, the auditor will seek to determine whether incompatible functions have been segregated within the MIS department's structure); the adequacy of data security features; and the adequacy of disaster recovery procedures.

It is central to the auditor's approach that he understand fully that the business environment is not static — that effective controls may become outdated or ineffective because of changes in circumstances and such factors as employee turnover. Because controls are dynamic, it is necessary to repeat review procedures periodically to determine whether unplanned and unmanaged changes in the control environment have occurred.

To determine the effectiveness of controls that are now embedded in computer software and the accuracy of transactions that are recorded electronically, auditors have developed new approaches.

What are the auditor's motives? Why is the auditor interested in various aspects of computer-related controls? How does the auditor go about testing these controls?

Despite the manual effort, paperwork and inefficiency of the older manual systems, they did have the advantage of leaving a clearly defined trail for the auditor. Auditors typically selected transactions and reviewed the underlying paperwork to make sure the control systems were operating properly. Early computer-based systems maintained the paper trail; auditors often monitored such systems by ignoring the computer — auditing much the same as they always had. These older audit approaches often are no longer possible.

To determine the effectiveness of controls that are now embedded in computer software and the accuracy of transactions that are recorded electronically, auditors have developed new and different audit approaches. They must ascertain that these "invisible" computer-based controls are in place and functioning.

Processing test data, for example, is a procedure whereby the auditor designs and processes sample transactions to see whether the system accepts or rejects different transactions. This procedure enables the

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auditor to confirm the existence or absence of programmed controls in the application system. By processing a comprehensive set of such transactions, the auditor can be assured that application controls function effectively and error and exception reports are appropriately inclusive.

Embedded in system

Integrated test facilities are similar in concept, but test routines are actually embedded in the application system to capture and test transactions — often "live" transactions. Another audit approach may be for the auditor to sit down and review the logic of the application software to determine if it functions as purported. This approach is usually used as a last resort because it is often the least cost-effective.

Auditors' motives for wanting to review DP general controls are not as apparent as their need to review application controls; nonetheless, this aspect of the review is equally important to the auditor's ultimate decision on whether the financial data produced by an organization's computer system is reliable.

Although MIS professionals accept the need for auditors to review and test application controls, one may question the need to address what auditors call "DP general controls." These controls relate to general activities of the MIS organization, such as the plan of organization and operation for the data center, procedures for documenting, reviewing, testing and approving systems and program changes and control over access to equipment, programs and data files.

Auditors' motives for wanting to review such matters are not as apparent as their need to review application controls; nonetheless, this aspect of the review is equally important to the auditor's ultimate decision on whether the financial data produced by an organization's computer system is indeed reliable.

Consider the following case. An organization has a sophisticated systems environment. The auditor's review of significant accounting applications indicates that application controls are strong, leading the auditor to believe that significant audit reliance can be placed on them. However, it is determined that the organization's general controls cannot be relied upon to any significant degree because those controls relating to access to production applications programs and data files are very weak.

In this situation, employees with the technical expertise to change programs had ready access to production programs. They could modify them and return them to production status without independent review or supervision. Under the structure of the data center's organization, there were effectively no procedures restricting employees from access to programs and data files.

This lack of procedures created the opportunity for an employee to make an unauthorized change to a program — payroll or disbursements, for example — for personal benefit.

Weak general controls

Despite the fact that controls in specific applications were outstanding, the overall systems could not be relied upon because of the weak general controls. The auditors simply could not assure themselves that the current applications programs had been used throughout the year in the same form as they then existed. Unfortunately, more extensive and expensive audit procedures had to be employed.

It is important to point out that when your auditors analyze controls, as in the example above, they are only assessing and evaluating existing procedures and segregation of duties to identify circumstances that could lead to a material error or irregularity in the financial statements.

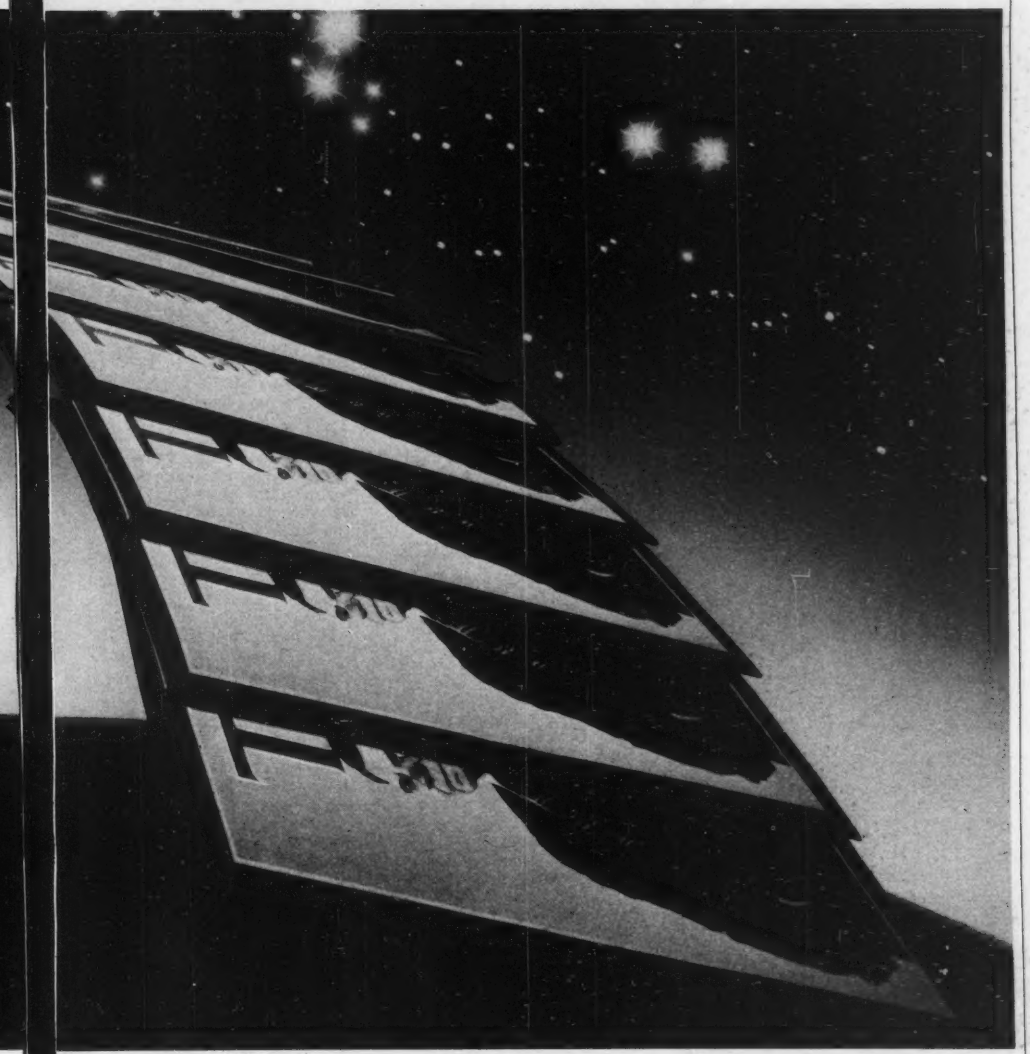
This analysis is not unique to computer-based systems; it is really no different conceptually than similar analyses of manual systems. Such an evaluation is necessary under the standards auditors must follow. In no way is this review an evaluation of the personal integrity of any particular employee.

Data security review

In today's rapidly evolving telecommunications environment, data security is of increasing importance and concern. It is essential that some information resources be maintained on a confidential basis since survival in the competitive marketplace may very well depend on your organization's ability to protect its trade secrets.

Given the importance of maintaining confidential information and the propensity of hackers to violate that confidentiality, it is little wonder that managers are looking to MIS professionals and auditors for additional assurances that reasonable procedures are in place to protect the organization's information assets. Auditors recognize that a truly effective effort to control data security

our data communications systems.
?



MOTOROLA/codex

Avoid surprises by understanding in advance who will receive the auditor's report. Ask to review the audit report prior to finalization, and do your part to increase harmony with the auditors.

requires the dedication and interest of MIS professionals.

The skills of auditors and MIS professionals can complement each other in addressing data security. Each professional can make an important contribution to the evaluation of an organization's exposure to security risks.

Approaching the challenge of data security by combining the auditor's broad-based knowledge of the organization's information systems, interrelationships between applications and external viewpoint as to what constitutes sensitive financial information with the MIS professional's technical expertise pertaining to existing security systems design, hardware and software is an effective utilization of resources.

The benefits of installing security measures designed to keep unauthorized individuals out of your organization's computer systems are clear. But we all recognize that tough data security measures may make the overall system less efficient by restricting access of bona fide users. Practical trade-offs are required; why not work with the auditors to consider those trade-offs together?

The importance of planning for recovery from a DP disaster is clear to MIS directors. Unfortunately, all too often management does not allocate sufficient resources to mitigate potential problems that may arise and have a crippling effect on the organization.

Disaster recovery planning, like data security, is an area where the coordinated efforts and recommendations of DP auditors and MIS professionals can result in a true service to the organization. A united approach to demonstrating to management the real and potentially pervasive risks of not properly planning for a DP disaster could save your organization substantial resources.

Suggestions for MIS

Clearly, there are a number of steps that can be taken by both MIS professionals and auditors that would have a positive effect on your organization's overall efforts to maintain a high level of computer-related controls. Some are obvious, others are more subtle.

Here are some suggestions that might help MIS professionals working with auditors more effectively fulfill their responsibilities:

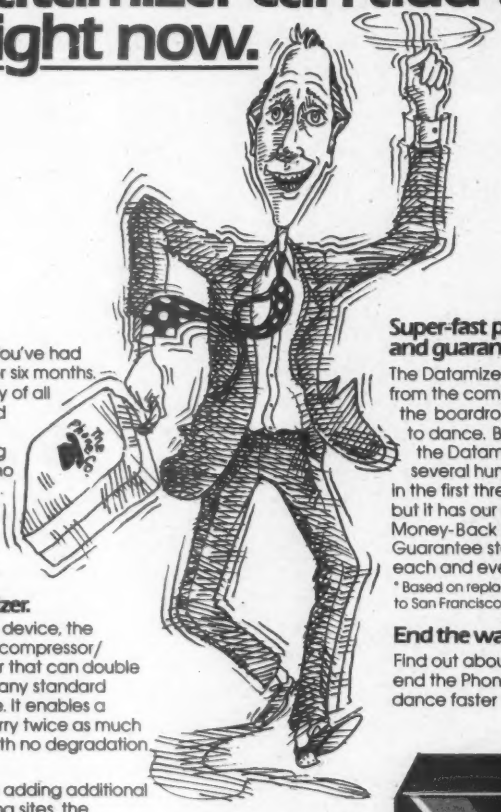
■ **Preaudit meetings** — Preaudit meetings should be held to ensure that you understand the objectives of the pending audit. Contribute to auditor scope decisions by expressing your concerns candidly. MIS director's observations about controls and operations are extremely useful in reducing audit emphasis in areas of low risk and appropriately increasing audit focus on areas of higher risk.

■ **Review audit reports** — Avoid surprises by understanding in advance who will receive the auditor's report. Ask to review the audit report prior to finalization, and do your part to increase harmony with the auditors. Don't allow the auditor to proceed with a report containing an erroneous assessment of your system. Offer to review audit recommendations to resolve factual issues before the report is distributed to top management.

■ **Retrieval software** — Offer to help the auditor review and evaluate the technical capabilities of audit retrieval software to ensure that purchased packages can be fully utilized in your systems environment. Ask what type of audit information the auditor obtains today and what information he would

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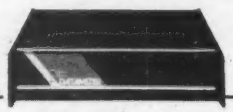
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like to have, but doesn't. You can be of real assistance by helping the auditor use utility programs or query languages to extract the desired information.

Providing staff to help develop audit modules will save significant audit effort and save your staff time in the long-term.

■ **Integration of technology** — Initiate joint projects to study and coordinate the effect of introducing new technology into the organization.

Introduce training seminars to help other employees cope with these changes. For example, many organizations are now developing microcomputer guidelines, including related policy and procedure manuals and organizing employee training seminars.

■ **Systems development** — Make auditors an integral part of systems development teams so that their recommendations for control enhancements are considered at the outset, rather than as systems modifications. This approach provides additional assurance that significant control issues are fully considered in advance and that costly after-the-fact modifications are avoided.

■ **Education programs** — As technology progresses, auditors will need to acquire many of the skills that MIS professionals possess. Consequently, many training programs (in-house and otherwise) attended by MIS professionals will be of value to auditors as well.

Encourage camaraderie and professional interchange among audit and MIS professionals by sponsoring joint technical sessions to discuss evolving hardware and software technology and its impact on your organization.

If you seem to be spending too much time teaching your auditors about technology, you might eliminate the problem by inviting them to attend relevant educational events.

■ **Technology updates** — As new technologies are introduced by vendors, share the information with audit personnel. Advise them whether new technologies are likely to be incorporated into your organization's systems and, if so, how new technologies may affect existing controls and create or mitigate security risks.

■ **Staff exchanges** — Arrange for staff of the respective departments to participate in short- to intermediate-range projects or assignments in the other department as a means of improving complementary technical skills.

This exchange will give staff a better appreciation of the other department's goals, objectives and problems.

It is not that MIS directors have been deficient in their past efforts; many auditors may have been guilty of trying to keep MIS in the dark as to their goals. But if the auditors don't take the initiative, MIS is encouraged to do so. The auditors likely will reciprocate soon.

MIS' court

These recommendations place the ball in your court. It is not that MIS directors have been deficient in their past efforts; many auditors may have been guilty of trying to keep MIS in the dark as to their goals and mission.

Clearly, auditors should take steps similar to those suggested in this article. But if they don't take the initiative, MIS is encouraged to do so. Your auditors likely will reciprocate soon.

Advancing computer technology will continue to have a significant impact on the information and control systems of most organizations. As a result, management and boards of directors will be increasing their emphasis on this important topic. They are likely to devote greater resources toward the goal of ensuring that utilization of computer-related technology does not create unacceptable control and security risks.

Marshaling these resources toward the common objectives of strong computer-related control systems and an efficient and effective monitoring function will require the skills of both audit and MIS professionals.

Developing a coordinated and cooperative effort among these professional groups within an organization will help ensure that resources committed to this effort are well-utilized.

About the authors

Gerald M. Ward is an audit partner in the New York office of Price Waterhouse where he concentrates on the audit applications of microcomputer technology. He is the author of Price Waterhouse's recent booklet "Managing Computer Risks" and is co-author of the National Association of Accountants' research study "Managing Microcomputers: A guide for the financial policymaker."

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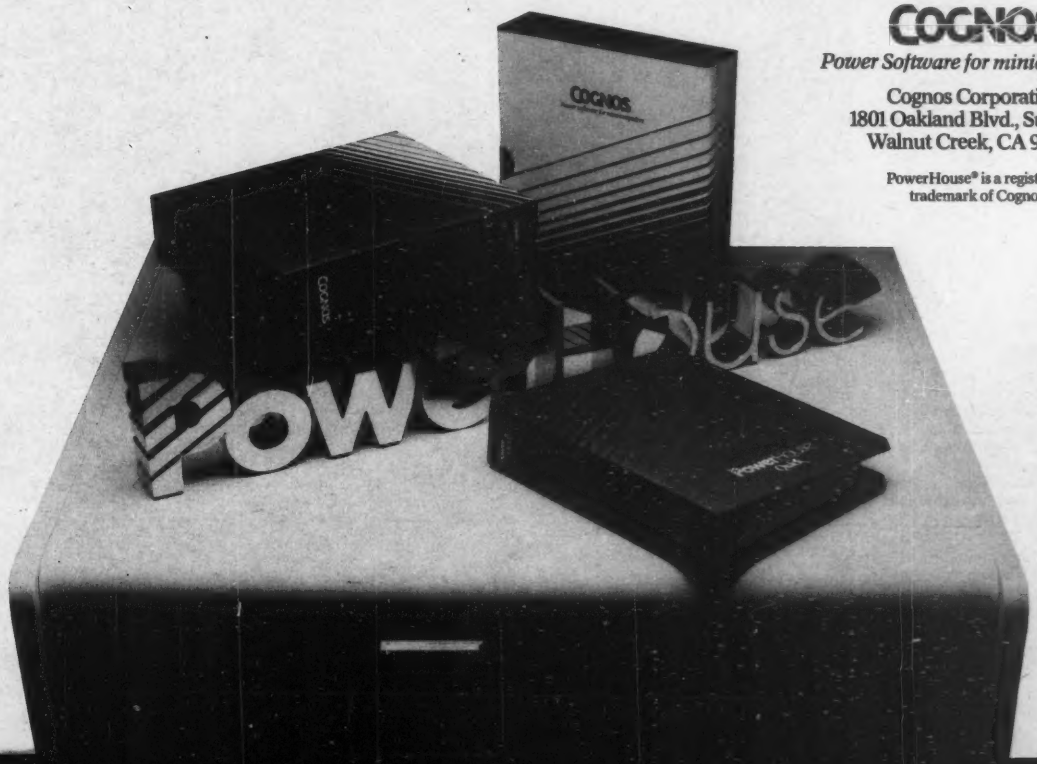
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PROFITING

(Continued from ID/13)

process, a negative situation can be turned around and used to help the data center staff with important issues. Most managers can easily produce a list of items that they feel are important and need attention, but for a variety of reasons the list is not given appropriate consideration by information processing management.

A good data center audit, particularly one that has the cooperation and support of the entire data center staff, can help bring the proper focus to important data center issues.

The audit can be used as a means to help push these issues to a more prominent position and to help bring a sense of urgency to some of the critical data center needs that are not currently being met.

In anticipation of the audit, the data center manager should review those areas of the operation where he can build a case for increased support. He should be prepared to request support from the auditors for those areas.

Often these issues have been raised in the past but with limited, if any, success. Now the manager should obtain the support of the auditors to strengthen the case for action.

Operational controls

One example of an important data center issue that is often a problem is adequate operational controls in application systems. Operational controls, particularly with regard to systems designed in-house, are not given sufficient attention by those who have design responsibility for those systems.

Every data center has systems in its operational applications portfolio that do not provide adequate means of enabling data center personnel to determine whether or not the processing runs have been carried out correctly.

Even when these systems do have some type of controls, the controls are inadequate. They are weak, incorrectly documented, too complex or incomplete.

One of the auditors primary concerns is the adequacy and appropriateness of the controls associated with the operational systems in the data center. It should be relatively easy to obtain the assistance of the auditors in supporting improvements in the quality of these controls.

It is in the best interest of the data center staff to, where practical, push for the design of systems that might be described as self-controlling. The concept should be to design adequate internal controls in these application systems so that if problems arise, the system will not allow processing to continue until the problem has been corrected.

The process can be as simple as automatically checking, within the system, I/O totals from program to program to make certain they are in balance. If an out-of-balance condition is encountered, the system should stop processing until the error is located and corrected.

It is not at all unusual to find instances where considerable time and effort have been expended to process a large system that has not been in balance. Many data centers could benefit greatly from improved application systems controls.

Adequate controls

In too many organizations, this is an area where the requirements of the data center are often overlooked. Once the particular system is operational, the data center has to bear the brunt of the difficulty encountered in attempting to manage the system. Without adequate controls, this is a difficult task.

The lack of adequate controls for the application system is not the data center's fault. But if the production runs are found incorrect, the data center staff will take a great deal of heat from the clients.

In addition, the system will have to be rerun, which places an additional burden upon the data center staff and its production schedules. The data center has a significant concern with adequate application systems controls; it should be supported by the auditors in the attempt to improve those controls.

Information processing standards that outline the need for adequate controls in operational systems, whether they are developed in-house or purchased, are necessary.

These standards should spell out in sufficient detail how the controls are to be



While members of systems and programming will resist an effort to improve controls in existing systems, an appeal should be made to the auditors for help in strengthening those controls.

designed. Everyone who is involved in the development or purchase of applications systems must understand what is required. Once the standards are in place, they must be adhered to; it is the responsibility of the management of the information processing department to see that they are enforced for every system.

Process to alert

When any new application system is considered for implementation in the operating environment, there should be a process that alerts the data center to the fact that a new system is being considered.

A provision should be made to allow the appropriate members of the data center to be actively involved in the process.

This involvement will ensure that adequate controls are in place. It is in everyone's best interest to deal with the installation of strong applications systems controls prior to the implementation of systems, rather than after the fact.

Existing systems also require adequate controls. It should not be too difficult to demonstrate the need for improved controls in these systems to the auditors. While members of systems and programming will resist an effort to improve controls in existing systems, an appeal should be made to the auditors for help in strengthening those controls. In many instances, it will not take too much effort to improve those controls.

Automating the library

The automation of the tape library is another area that can be improved with the help of the auditors. While it is hard to understand, there are data centers that operate without the assistance of an automated tape library system. The cost of such a system is small when you balance it against the cost of problems with a manual system: reruns resulting from incorrect tape handling and management and the high degree of vulnerability to the entire organization.

Manual methods also present a security problem. The loss of valuable organizational data through carelessness or deliberate destruction should be of great concern to all data center managers.

An automated tape library management system is not an absolute guarantee of tape security and integrity, but a good package will provide a very high level of security in areas where tape handling errors or security threaten the operation of the data center and the organization.

Staff training

Auditors can also provide assistance with training and upgrading data center staff. As the data center function grows more complex and the demands of the data center clients increase, the requirement for a competent, well-trained data center staff will also increase. New skills must be mastered if the staff

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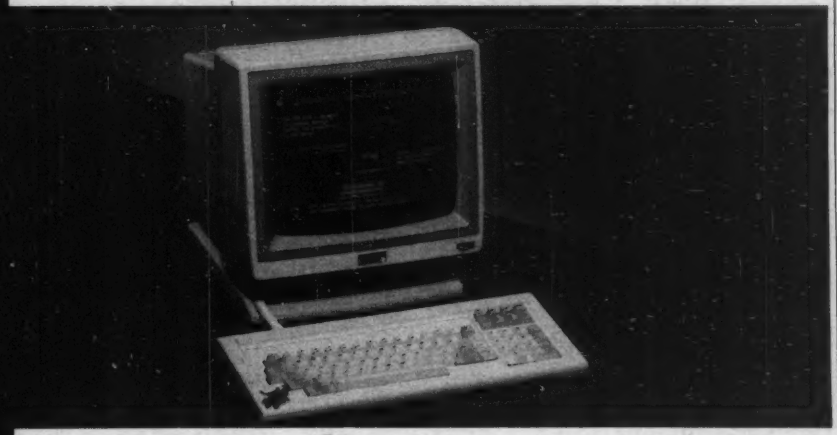
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Cross training

Another aspect of training is the continuing cross training of staff in order to assume sufficient depth within the data center. As the mission of the data center becomes more complex and demanding, pressure will build for qualified staff. Key people will become attractive to other installations; loss of data center personnel must be anticipated. A crisis situation may develop if there are not enough competent employees to help withstand these losses.

It is often difficult to secure adequate funds for the education and cross training of data center staff. Help can be obtained from the auditors in the effort to secure funds for an education and cross-training plan.

The development and ongoing maintenance of an effective data center contingency plan, while of great importance, can be very difficult to sell to the senior management of an organization.

Security becomes an increasingly difficult data center issue as the function of the data center grows. Whether or not access to the computer room should be restricted to members of the data center staff has been resolved in many installations, but there are other security issues that need attention. The inherent damage to the organization that can be caused by lax data center security procedures should be of major concern to all data center managers.

The development and ongoing maintenance of an effective data center contingency plan, while of great importance, can be very difficult to sell to an organization's senior management. These three factors make the issue of data center contingency planning and testing difficult to sell:

- The feeling on the part of senior management that a disaster will happen to someone else. This feeling may be reinforced by the fact that many of the organizations with which these people are familiar do not have data center contingency plans so it does not seem necessary to worry about the issue.
- Development and maintenance of the data center contingency plan costs money. Today, when great emphasis is placed on cost containment and reduction, additional expense items are not viewed in a favorable light.
- If the service level of the data center is not high, senior management will be more interested in the improvement of the service level than in the development of a contingency plan. Raising the service level should not mean ignoring contingency planning.

An effective, well-tested data center contingency plan that is maintained on an ongoing basis is critical. A contingency plan should be of great concern to the auditors and receive appropriate attention in the audit report.

Data center managers often do not see the need for a contingency plan. Taking such an approach is not in the best interest of the organization. An increased awareness of the need to develop a strong contingency plan should be of considerable interest to conscientious data center managers.

Physical security and data security should also be reviewed as a part of the data center audit process. The requirement on the part of information processing management to support the data center regarding these issues — if not forthcoming — should be addressed in the audit report.

This may also be the appropriate time to bring up the need for a security manager within the data center section. One aspect of this issue is to establish a clear line of responsibility and authority for the various aspects of information security, most of which either originate in or involve the data center function. The size of the data center function will determine whether this should be a full- or part-time position, but the need should be raised, and the data center manager should ask the auditor for assistance.

Turnover process

Another, perhaps less obvious, security issue is the question of the turnover process for new operational programs from the systems and programming section to the data center. A considerable amount of the difficulty the data center faces with applications systems can be traced to the fact that new versions of operational programs are placed in the data center production environment without the knowledge of data center personnel.

It is a rather straightforward process to build a data center environment that will provide greatly increased control over the submission of new programs to production status. It is also often the case that when data center management attempts to build and enforce such constraints, a political battle develops with the systems and programming section.

The systems and programming group often contends that there is not enough time to inform the data center of the fact that changed programs are being prepared for the



operational systems. There is also the argument that if the data center is allowed to control the submission of new versions of operational programs into the production environment that it will only create increased red tape.

Astute data center managers will recognize the potential value of the data center audit and work to obtain the auditor's support.

Both of these arguments are invalid. The improved operation of the data center that will result from increased control in this area will more than offset any additional effort.

An effective process of notification to the data center and increased control by the data center of operational programs can be put in place. The support of the information processing department's management will be required, because it is unlikely that the systems and programming section will agree willingly to such an arrangement. The auditors should work with the management of the data center to help everyone concerned understand the benefits of such an environment.

Careful testing

All programs submitted to the data center for production should be carefully and thoroughly tested before going into production. The data center and its clients who will use the output of those programs should be involved in the testing process in order to ensure that whatever they may require is produced by the program.

No program should be placed in operation until approved by the data center and by the clients. This should be a standard of the information processing department.

Business pressure or impatience on the part of members of systems and programming should not be viewed as valid reasons to circumvent the testing process; doing so will come back to haunt everyone.

Typically, many data center managers face a problem with their immediate managers. The cause of this problem is cultural.

Often the information processing manager does not have an operations background, which makes it difficult for the data center manager to build a strong case for support for some of the issues mentioned previously.

It is also often the case that many responsible requests become entangled in political arguments with the management of the systems and programming group. Because they often have a systems and programming background, information processing managers will rule in favor of systems and programming.

Because these situations tend to be rather commonplace, it is often the case that the management of the data center will, in time, simply stop attempting to push for necessary improvements. But surrendering to systems and programming is not in the best interest of the information processing department or of the organization.

The assistance of an impartial third party, such as the auditors, can play an important role in helping the data center obtain increased support for some of these important issues. At the least, a well-done audit report should provide a forum for raising these issues and produce discussion about their validity.

Astute data center managers will recognize the potential value of the data center audit and work to obtain the auditor's support.

The best approach to the data center audit is to recognize its potential benefits. Although some of the issues raised may cause discomfort, it is important to consider the audit process as an opportunity to improve the data center environment.

About the author

John Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, *published by Dow-Jones Irwin.*

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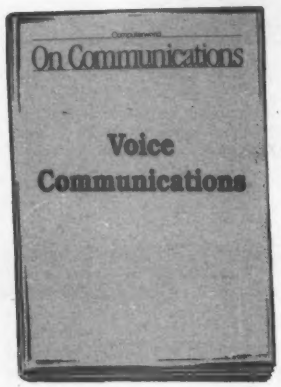
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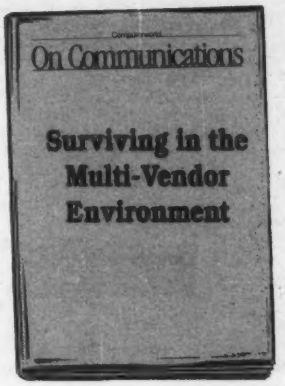
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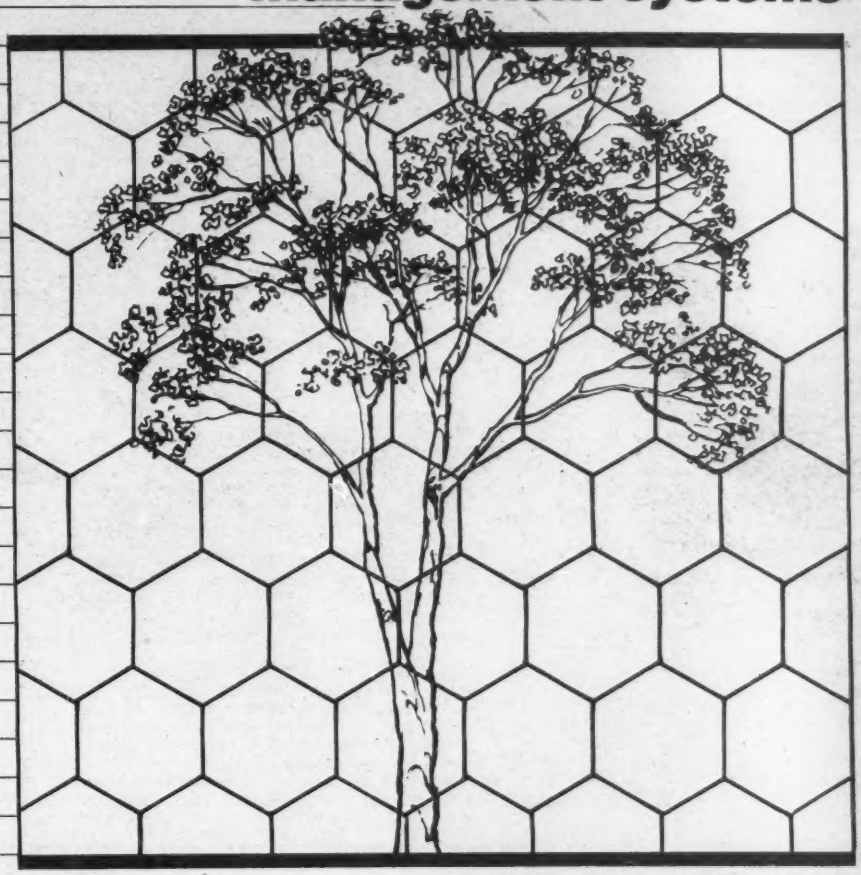
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SPECIAL REPORT

Data base management systems



Not whether, but which

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SPECIAL **REPORT**

Integrated DBMS paving the way to one-stop shopping

By Paul Gillin
CW Staff

Once upon a time, the market for packaged software was easily definable. Data base vendors sold data base management systems (DBMS), applications vendors stuck to applications packages and utility vendors vended utilities.

But the lines that once separated those functions are quickly being erased, with implications that could change the ways in which users evaluate and buy software, according to observers interviewed by *Computerworld*.

As in the past, DBMS will probably drive the evolution. "I think we're going to see a tremendous upheaval in the data base market," said Ron Ross, editor of the "Data Base Newsletter." "We may soon see the next generation of DBMS coming."

Among the major trends that will affect the DBMS market for the next several years are:

- Broad expansion of the vendors into new markets, including packaged applications, development aids, microcomputer software and micro-mainframe links.
- The need for many DP shops to rewrite aging applications, a move that will lead them naturally to consider moving to new data base architectures.
- Increases in the use of multiple DBMS.
- A move by vendors toward integrating applications more tightly around a central DBMS.
- The forging of new links between software vendors in what once were considered to be dramatically different markets.

While most of these trends have already begun to emerge, the effects on users are not yet clear. The evolution of the data base industry will undoubtedly present users with many new opportunities, but it will also make their selection of a DBMS vendor even more critical, observers said.

Perhaps the major new factor will be the evolution of the one-stop shopping concept of software purchase. Cullinet Software, Inc., for example, now offers a line of applications software, as does Cincom Systems, Inc. Applied Data Research, Inc. and Management Science America, Inc. have a deal to tie their two product lines more closely together. Software AG of North America, Inc. is also providing assistance to applications houses that want to build on top of its Adabas DBMS.

DBMS market limited

This new activity is largely due to vendor realization that there is a limited market for DBMS, according to Herb Gepner, managing editor of software, Data Decisions, Inc., in Cherry Hill, N.J. "DBMS won't drive the market so much as will the demand of DBMS users to integrate packages into their environments," Gepner said. "[Integrating applications] may be what will save the DBMS vendors."

John Cullinane, chairman of Cullinet Software, responded, "There's an element of truth in that," but claimed that the evolution is quite logical. "If our clients need results, we respond to that. It seems natural to offer applications that are fully integrated with the DBMS."

For users, integration may be the stumbling block. While most DBMS and applications vendors today claim that their applications are fully integrated, the level of such coupling is difficult to determine. "Very few vendors have true integration. They mostly have what you'd call 'transparent calls,' " Gepner said.

Ross added, "The strategy many vendors are trading on is that if they can keep DP people happy within a data base, a fourth-generation language and a few other things, they can turn that into a business application strategy. That's not necessarily true."

Ross believes data base technology itself has a longer road to travel before it can begin to provide software from cradle to grave. "I think we're just on the frontier of building DBMS that do permit substantial [tailoring]," he said. "I'm not sure the plunge into other applications is a winning situation."

Despite heavy promotion by vendors, one-stop shopping has apparently not yet caught on, according to recent research by Input, Inc., a market research firm based in Mountain View, Calif. "One-stop shopping isn't really that popular yet," said Glenn Noreen, an Input consultant.

Input's research found that users would still rather buy their applications from an applications vendor and their DBMS from a vendor with a solid reputation. "What is more important is going with a vendor with good support and a reputation in that field," Noreen said.

Nevertheless, Input is forecasting that the idea will catch fire. The firm projects that sales of applications that are integrated with a DBMS will increase from $160 million in 1984 to $3.3 billion in 1993, an 83% annual growth rate. That compares with an Input forecast of 30% average growth in expenditures for applications software in general.

Ultimately, the expanding market could be a mixed bag for users. On one hand, their purchasing decision cycles may be cut to nearly nothing if the chosen vendor has an offering in that area. The benefits of tighter integration are also apparent.

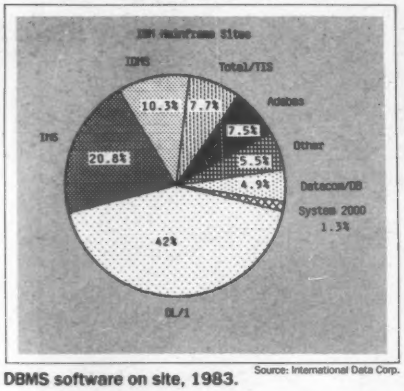
Conversely, users could be treated to "brainwashing by ad campaigns and promises" from vendors trying to establish major new accounts, according to Shaku Atre, president of Atre International Consultants, Inc. in Rye, N.Y.

The expansion of the dominant companies could also combine to squeeze out smaller competitors that cannot afford to offer a broad line of products. "I think any user will be leery about getting into bed with any vendor who doesn't have a track record," Gepner said.

At the same time, however, a door may be opening for smaller, but more specialized DBMS products. The market will be driven by the need of many shops to update or replace existing applications built on older DBMS technologies. While the traditional vendors will remain strong, new technologies may proliferate as the concept of multiple DBMS becomes more viable.

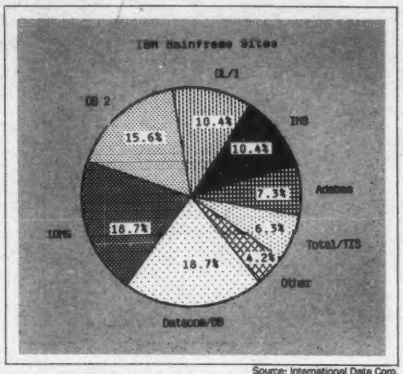
"I think we'll see the replacement market becoming a major force toward the end of the decade," Ross said. "As good a product as [IBM's] IMS is, it will be 20 years old at the end of the decade. Also, by 1990, relational systems will have been tuned for performance, so they'll become viable options."

Gillin is senior editor for software and services at Computerworld.



Source: International Data Corp.

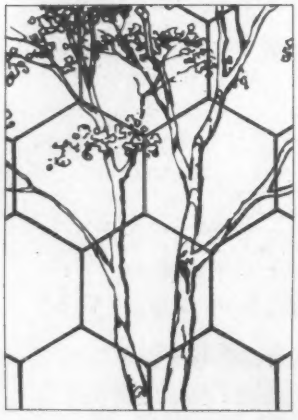
DBMS software on site, 1983.



Source: International Data Corp.

Planned DBMS acquisitions, 1984.

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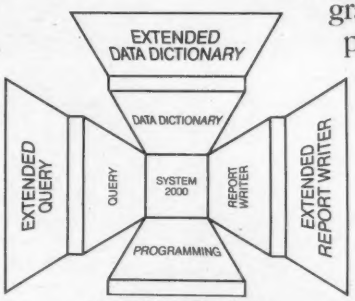
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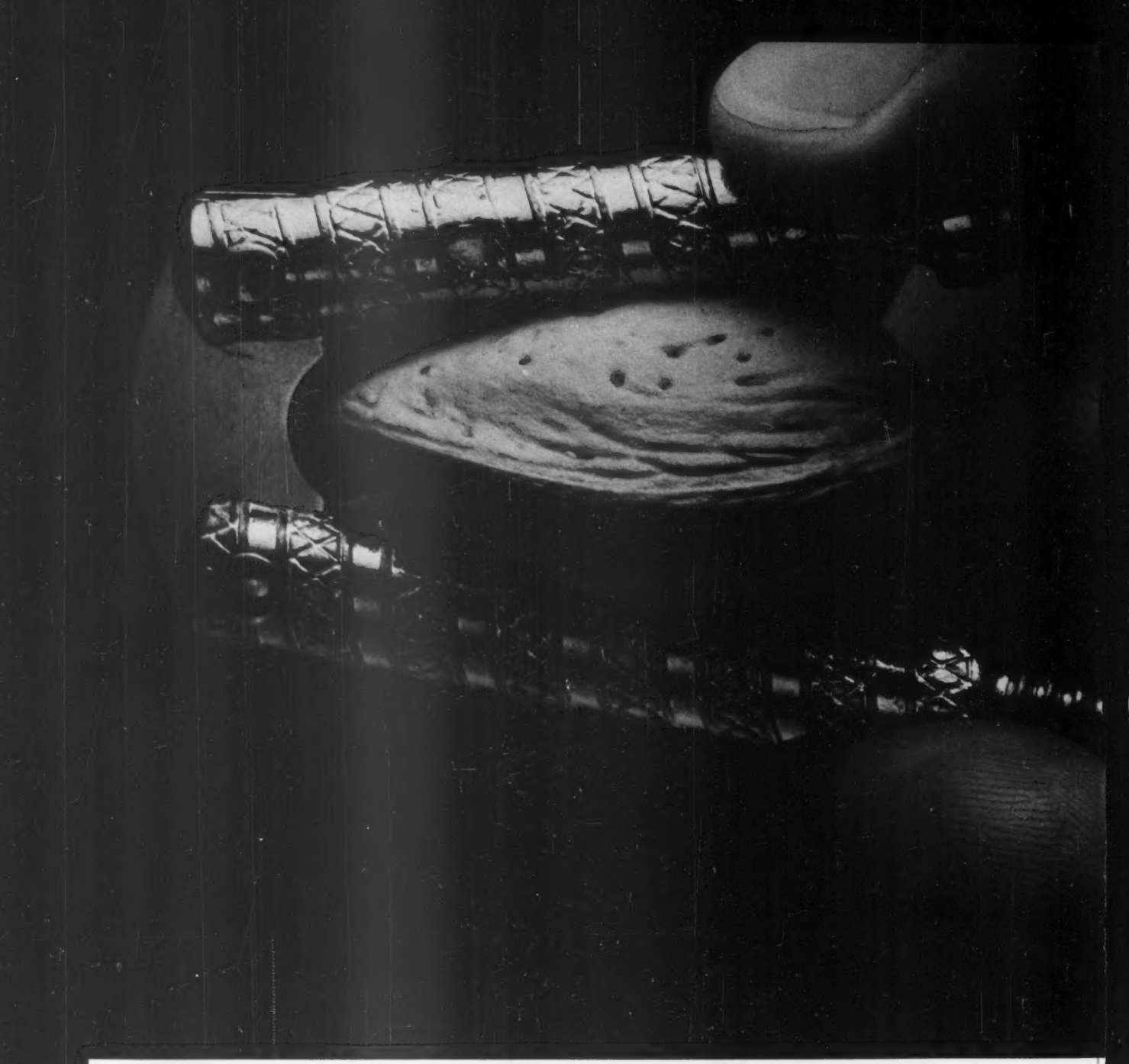
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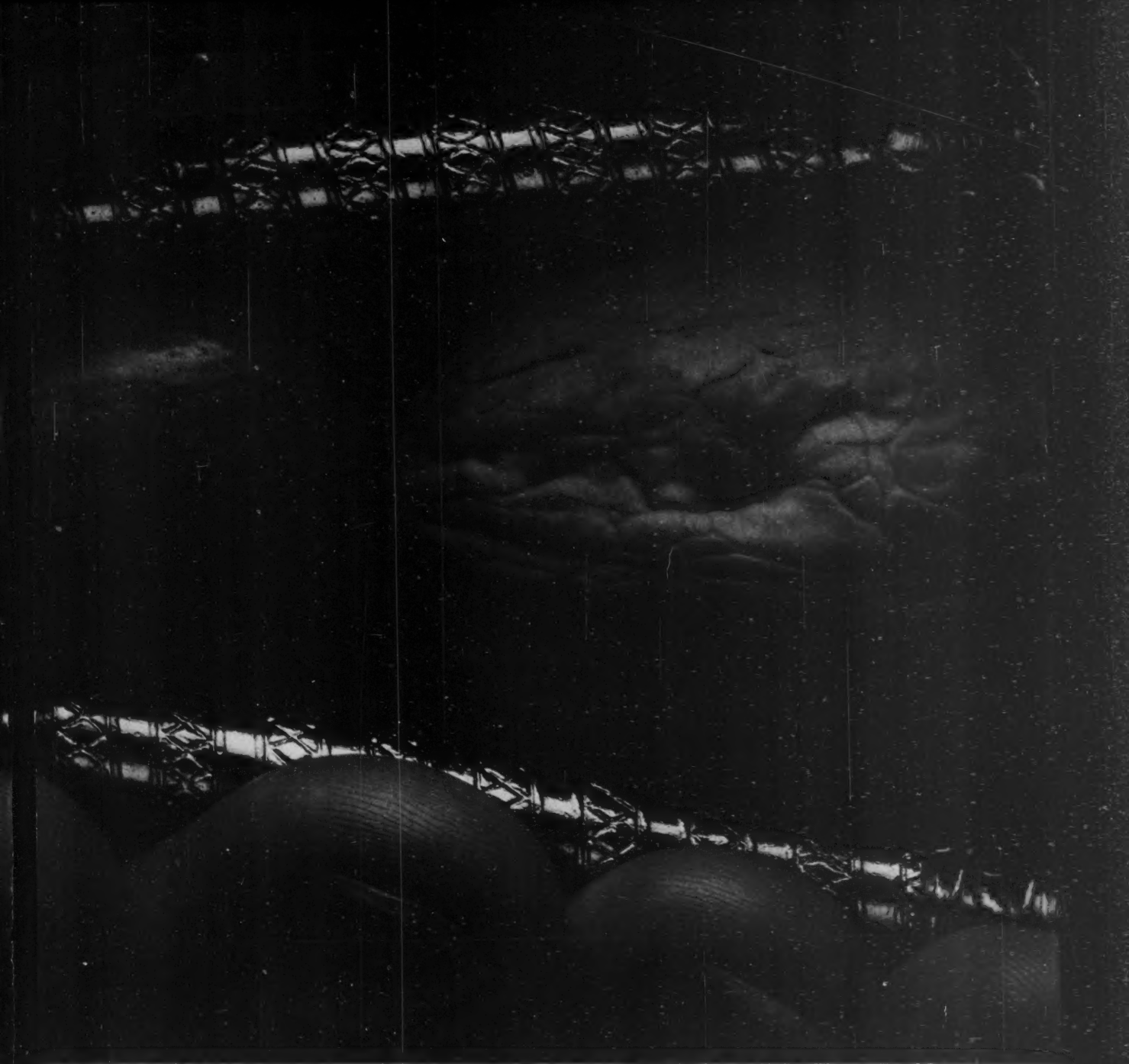
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SPECIAL **REPORT**

Insurance company benefits from relational system

LOS ANGELES — During its seven years in use, a relational data base management system (DBMS) has proved to be a premium investment for an insurance company here.

Fremont Indemnity Co., a firm that provides workmen's compensation benefits, uses Applied Data Research, Inc.'s Datacom/DB to keep track of the millions of pieces of data generated by its clients' claims and premiums.

As a $500 million company in a data-intensive industry, Fremont keeps 30 million records across more than 200 files. The number of records is currently growing at a rate of 10 million a year, and, by 1985, it will be growing at double that rate, according to Bob Cancilla, the firm's data base administrator.

"For the number of files we deal with, a relational structure is the best way to go," Cancilla said.

Fremont's DP staff handles operations for itself as well as for its parent company, Fremont General Corp. Corporate information is mostly relational, and day-to-day insurance business is hierarchical, according to Fremont's insurance systems manager, Frank Hernandez.

"Datacom/DB enables us to support both environments in a single corporate data base without replication of data," Hernandez said.

Cancilla said there is no such thing as data entry at Fremont because data is captured with ADR software in the normal course of a day's work. "A logical business function results in the many physical data base activities [including] the creation of audit trail records, posting of management summaries and the creation or updating of data records."

System switch

Fremont has been maintaining more than 200 users on its IBM 3031 with 4M bytes of memory and 15G bytes of disk capacity. Because the firm expects the number of users to increase to over 400 by the end of 1985, the company recently switched to an IBM 4381 with 8M bytes of memory, Cancilla said. Even under the 3031, he said, DP was able to deliver four-second response times for about five million data base service requests a day.

While the number of users is growing, Fremont's ADR software — which also includes ADR/Datadictionary, ADR/The Librarian, ADR/Dataquery, ADR/Vollie and ADR/Look — has contributed to a reduction in the DP staff from 127 to 54, Hernandez said.

"Our programmers do all the on-line data base systems development," he said. "If you have a well-designed data structure, programming becomes very simple."

The insurance section alone has cut its DP staff from 40 to 13 and has saved over $2 million a year in its claims department since it acquired Datacom/DB.

The decrease in personnel came mostly with the switch from a predominantly batch Isam system to the on-line Datacom/DB system, according to Hernandez.

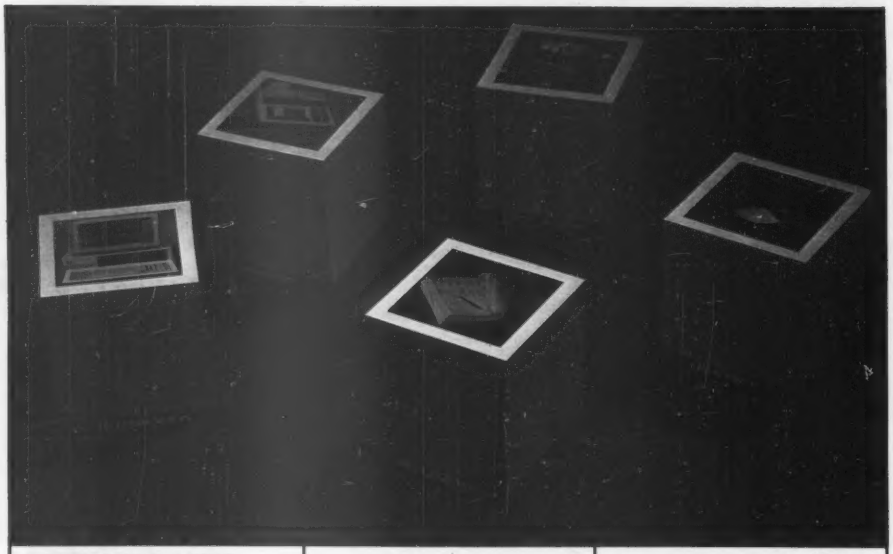
The savings in the claims department, Hernandez said, have two sources:

- Decreased overhead. Most of the overhead savings are directly related to the drop in the number of programmers.
- Automation of the California Relative Value Studies. This statewide medical fee schedule assigns rates for doctors' services. The DBMS provides instant comparisons between the assigned rates and actual charges on clients' medical bills, allowing for quick claims processing and reduced costs.

Most of DP's work to date has been aimed at supporting day-to-day business operations, Cancilla said. But future efforts will include a broad range of management-support applications, such as financial reporting, a management support center and marketing strategies.

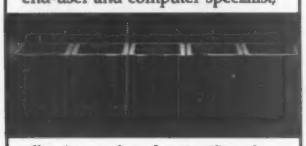
The firm also plans to provide services to its agents and customers via direct telecommunications links.

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MARTIN MARIETTA

Follow employee hiring practices when choosing DBMS

By Andrew M. Garland
Special to CW‡

Companies look for expert knowledge and the ability to add to the organization when they hire managers. The problems of hiring a manager demonstrate many of the problems of buying a data base management system (DBMS).

Consider what happens when the manager interviews for the job. The manager brings the following to the interview:

■ His personal presence. The employer receives an initial impression from the clothing, speech and personality of the manager. A competent person is expected to present a good image from the start. Of course, judgment is used to overlook minor problems and to discount flashy presentations.

■ The resume. The evaluation starts from this statement of what the manager has learned and done elsewhere.

■ A list of employment references. The references must show that the manager successfully applies his or her abilities in practice, perferably in work closely related to the job being offered.

The employer also brings something to the interview:

■ A job description. The employer has a mental and written description of the job, both of which are probably sketchy. Part of a manager's job is to be productive, and the employer will want the manager to show how this will be accomplished.

Matching person to job

The employer is matching a complex person to a complex job. Many approaches are used to make this type of decision. Only experience may reveal what works best for each job and employer.

The amount of unknown information overwhelms any completely analytical approach. One cannot successfully hire "by the numbers;" interpretation is always present. For example, the manager's personality may be viewed as relaxed or without energy, depending on the interviewer. Employment references are chosen to display past successes only, and it is hard to investigate more than a few factors of prior employment.

The employer is not only ignorant of the manager's actual skills, but is also unsure about the job he is offering. Since this is a management job, the employer wants success, harmony, efficiency and production — but what will accomplish that? He must guess about trade-offs like independence vs. following policy, strong leadership vs. quiet coordination and technical skill vs. social skill. Also, the employer cannot alter these trade-offs; he must compare applicants and choose one. Hiring is not easy to do right.

The DBMS is also a complex system, whose first impression is determined by glossy folders and advertising and sometimes by the vendor's size or office layout.

Here, the reference manual is the resume, along with claims by salesmen. It is difficult or impossible to verify all of these claims, features and interactions of the DBMS. You are limited to testing only the most important, and you will rely on references from other customers for guidance.

You will not know of all the things a DBMS may do for you, and you will look to the DBMS as an expert guide to organizing application programs. There are trade-offs in DBMS' between formal or implicit languages, amount of central control available to the computer center, adopting a new (hopefully better) style of programming or integration with past work and ease of use or efficiency.

A large part of it will be a technical evaluation. The employer asks questions to determine the knowledge and experience of the manager, according to the employer's own standards. He attempts to verify the claims of the resume.

Some of the technical evaluation can be specific and supposedly objective. The questions can be listed and the answers can be recorded (with some difficulty).

However, even this part of the interview is subjective. The interview explores questions not in the original list, and the method and detail of the answers provides most of the impression. For example, a methodical answer may get a high grade even if it contains an error.

The employer matches a complex person to a complex job. Only experience may reveal what works best for each job and employer. The DBMS is also a complex system, whose first impression is determined by glossy folders and advertising and sometimes by the vendor's size or office layout.

The rest of the interview explores things that are even harder to standardize. The employer notes the clarity and organization of the manager's thought, how easily he understands the questions, and how well he handles fine detail. (This corresponds to ease of use in a DBMS.) The style and approach of the manager is noted, although these are not well defined, to decide if the manager fits into the organization.

Last, the employer estimates the potential of development, adaptability and growth for the manager within the organization. The manager must be able to correct defects and use criticism well. (This corresponds to maintenance and support of the DBMS.)

References are investigated after the interview to verify the manager's claims and to answer questions that arise.

The employer decides about the manager from the results of the interview and comments from previous employers. The manager is a complicated resource, with subtle and important features. Yet the results of the interview are sketchy.

■ The resume.

■ Notes from the technical evaluation.

■ General interview notes on the subjective matters.

■ Notes from conversations with former employers.

■ The opinions of the employer.

There is almost no information that a second person could use confidently; only the interviewer can interpret his own notes, determine the meaning of the resume and explain fully his formed opinion.

Similar approaches

DBMS purchases are rare, but hiring employees is common. Both present the same problems and require similar approaches.

Some differences make buying a DBMS less difficult than hiring a person. For example, a DBMS responds exactly to all questions asked of it, and it responds wherever it is used. This consistency makes outside references more reliable. The DBMS is also present for as long as needed to resolve questions that come up in testing.

Some differences make things harder. For example, the DBMS does not tell you if you have asked a misleading question or if there is a better way to accomplish something. It is secretive about both its good and bad points. Of course, the sales staff for the DBMS will inform you of its good points.

The entire company may use the DBMS, and this presents special difficulties. The main investigation of the DBMS is done by people with computer experience. They will work on a decision that interests most company managers, including senior management.

Hiring a manager is difficult. Only the interview can make the best judgment on incomplete knowledge. Most companies give at least two interviews for that reason, to apply more knowledge to the choice. This is for a single job within one department. It would require 10 interviews to hire a person having a major function in five corporate departments. And, many large meetings would follow to compare this candidate with others. This does not usually happen in hiring, because a single person does not work in five departments in a major way. But, it does happen when you buy a DBMS.

Avoid stressful meetings and wasted effort by using a different approach. Use a part of the computer staff to investigate thoroughly each DBMS of interest. The computer staff can write notes about the areas they have investigated, the results and the importance they attach to each area.

Other interested people can review the notes, talk to the investigating group, suggest additional areas to investigate and provide information about corporate priorities.

Garland is president of Software House, Inc., a Cambridge, Mass.-based firm.

DBMS traits make product selection a risky proposition

If you are responsible for buying a data base management system (DBMS), you will do more work and planning than you might expect from your experience with other purchases.

A payroll and accounting system may not be simpler in itself than a DBMS. These systems are programs of many functions, used by large numbers of people, relied on by staff and management and required to be bug-free. They must run in reliable and restartable ways, especially when they are printing payroll checks for the week. They may cost more than a DBMS and indeed may contain a DBMS upon which they are based.

Yet this type of package is easier to buy than a DBMS for the following reasons:

■ The buyer has a department devoted to accounting. These people know what they are doing now, and they know much of what they want to accomplish. They can refer to their experience to describe and observe what they want.

■ The program delivers direct and final capabilities that are easily observed in tests. The buyer can checklist the particular features needed and see the procedures and reports that will be used in the accounting operation.

■ The buyer can rely more on what the salesman and contract represent because accounting is a much more conventional service than data management. It is easier to specify a conventional feature than to provide flexibility, power and efficiency.

■ The seller is offering an application system that is usually designed for custom modification, at least in some ways. The buyer usually can negotiate specific features that he needs, so there is less pressure to consider trade-offs.

In contrast, a DBMS is bought to implement many applications, rather than being one itself. You will judge only a few of its direct results in the testing you do, hoping that its philosophy and approach will be equally valuable in the uses that you have not tried. Relying on this will probably make you nervous.

The DBMS represents the compact knowledge of an expert group (or it should). You buy it as an expert system; it should guide you to create better, more easily implemented application systems. Your computer use will change according to this expert advice that you purchase. This is the reverse of the application program, where you are the expert judging the value of what is presented to you.

SPECIAL **REPORT**

Nuclear physicists automate notebooks for on-line analysis

LIVERMORE, Calif. — Scientists working on nuclear weapons and energy research at the Lawrence Livermore National Laboratory here are getting a bang out of the relational data base management system (DBMS) they use to organize test data.

At the lab's Fusion Experiments Analysis Facility (Feaf), a superminicomputer facility supporting laser fusion research, the scientists are turning to the DBMS for simplified retrieval of measurement data collected from laser experiments.

In the experiments, laser beams heat hydrogen fuel to high temperatures until it fuses, resulting in a tremendous release of electrical energy. The energy given off by the fusion burn can be 100 times greater than the input energy. One ounce of the fuel in a fusion process gives off enough energy to power a household of four people for 150 years.

Research into laser fusion, a method of producing nuclear fusion with lasers, began after the first laser beam was developed in 1961. Researchers are now studying the experiments conducted at the Livermore Lab laser facilities to develop fusion's full potential for commercial applications, where it is seen as a source of long-lasting and inexpensive energy. Experiments with the laser also support advanced military applications.

The Lawrence Livermore National Laboratory, with approximately 7,000 employees, is operated by the University of California for the U.S. Department of Energy. The lab, along with the Los Alamos (N.M.) National Laboratory, leads the world in fusion research.

Before implementation of an Oracle Corp. Oracle relational DBMS at Feaf in 1980, scientists relied on loose-leaf notebooks, or shotbooks, full of information describing each laser fusion attempt, or shot. The shotbooks contained information gathered from instrument systems measuring the laser shot emissions — X-rays, light and ions — in the form of computer output, text summaries and descriptions.

"In that form, it was very difficult to correlate and examine results from different shots in any reasonable amount of time, especially when several people checked out shotbooks at once, leaving no way to compare the data," said Jerome M. Auerbach, manager of data processing at Feaf.

Deciding that something was needed to automate the fusion shotbook, Auerbach looked at several relational DBMS. He considered several systems for Feaf, including Digital Equipment Corp.'s Datatrieve and Relational Technology, Inc.'s Ingres. He said he chose Oracle because of its query language, SQL, and what he called its attention to the user interface.

"We wanted a system that would provide the 50 physicists using the system [with] flexibility in analyzing information from different experiments," he said. "Oracle provided access to the information without forcing users to understand the definition of the data base."

As a relational DBMS, Oracle displays information in two-dimensional tables of rows and columns, which can be manipulated to form the specific correlations wanted.

The hardware environment for the Feaf consists of two DEC VAX-11/780s, with 700M bytes of on-line disk storage and 5.5M bytes of memory. Data processing has been functionally split between the two computers, so that one VAX-11/780 controls the instruments and collects the data, while the other processes and analyzes the data.

Data processing of output from instrumentation involves four phases:

- Data collection.
- Digital-to-analog conversion.
- Physics summary data.
- Data archiving.

In the first phase, data collection, Oracle provides users with tables that map the connection between detectors and the electronic modules that record the data.

The mapping tables are used extensively to extract data from the shot files through use of the Oracle User-Friendly Interface and to organize it by diagnostic and detector number.

"The advantage of putting mapping information in Oracle is that data may be entered or extracted in any order using SQL," Auerbach commented. "Without this, programmers would have to set up mapping data files and write extensive software for such tasks as sorting."

Oracle also facilitates Feaf's second data processing phase — digital-to-analog conversion. Detector response and calibration data stored in Oracle are used to convert digital readings from measurement instruments into analog quantities, which experimenters need in order to understand and process the measurements.

While some of these values are measured by diagnostics, others must be calculated from a large set of parameters. Oracle simplifies these calculations by providing easy extraction and updates of the parameters stored in the data base tables.

Oracle also assists the digital-to-analog conversion of X-ray emissions from the laser shots. Response functions of X-ray instruments can be calculated on the VAX-11/780 in 20 seconds — compared with the 15 minutes a user previously spent at a terminal using many data files as input instead of Oracle, Auerbach said.

The third data processing phase at Feaf converts analog signals into true physics data for storage in the physics data base. Oracle provides experimenters with easy access and manipulation of this physics data to compare it with other results, such as theories and computer simulations.

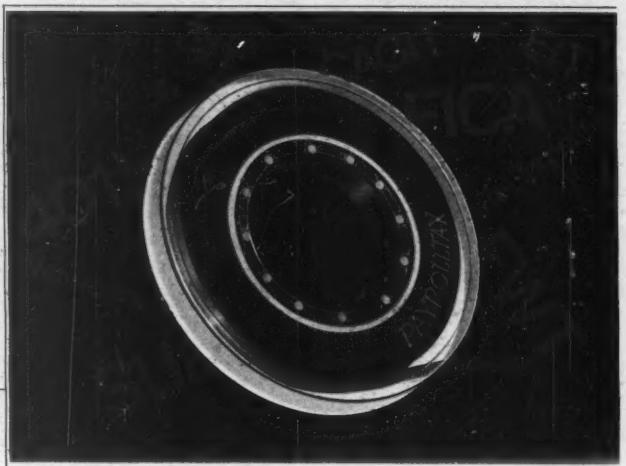
According to Auerbach, the data analysis VAX-11/780's on-line disk storage capacity is quickly used up when storing target experiment data, so an efficient means of archiving and subsequent retrieval of data was necessary.

Oracle has been instrumental in archiving, he said. A command procedure copies all raw data files within specified dates, updates the data base and, finally, deletes the data from on-line storage. Two tapes — an archive copy and a backup copy — are created simultaneously.

"With a simple lookup operation, we can retrieve any raw data from previous experiments and quickly and easily reprocess the data in light of new discoveries from target experiments," Auerbach said.

According to Auerbach, Feaf's plan for the future is to continue its data collection efforts, adding VAX-11s as the amount of data increases. The facility will eventually network its VAX-11s to a Cray Research, Inc. supercomputer, which will assemble models for physics data codes. Feaf will then use the models to design experiments aimed at preparing laser fusion for eventual commercial use.

These experiments will continue until researchers find a suitable fusion target for use in a commercial reactor. If this is achieved, and a commercial application seems feasible, laser fusion reactors will be built. However, Auerbach said, construction of reactors lies decades away.



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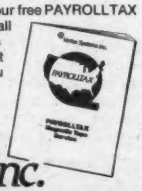
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Data Systems Supervisor
Central and South West Services

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Emphasis upon physical data structures can distract

By David Wood
Special to CW‡

One term that has been bandied about is "purely relational," focusing primarily on the physical data structure used for implementation. There are at least two problems with this particular term:

■ At the physical data storage level, nothing has really changed. If you look under the hood of a "purely relational" data base management system (DBMS), it invariably ties together groups of related records, using some type of physical pointer mechanism. To do otherwise is to invite serious performance problems.

■ Definitions of relational DBMS consistently emphasize the importance of independence from this physical level. Data management and accessing capabilities must be provided, regardless of the underlying physical structures that may be involved.

The real power of a full-capability, fully relational DBMS lies in its ability to enable algorithms to operate directly upon data structures as the algorithms view them, independently of how that data is physically stored within the data base. A full-capability, fully relational implementation permits applications and their users to take advantage of that power.

If we combine the two concepts of fully relational and full capability, we arrive at a basic definition of what a relational DBMS actually should be:

■ A system that functions as a full-capability DBMS and at the same time supports relational data bases and a procedural language.

Data base designs should reflect the integrated needs of all applications. In other words, the data should be organized in accordance with the way you do business. Increasingly, such designs are being modeled around the operations of the organization, rather than the needs of a specific application.

Conceptual data base models are implemented in the real world through data base files, utilizing the physical structures provided by the DBMS. Seldom in today's data base environments is the data physically stored in the same manner in which an application's algorithms view it.

The problems associated with each application having its own file structures specifically for its own needs are what led most organizations to pursue the concept of a data base in the first place.

However, many organizations are finding that different parts of their conceptual data model are implemented within different DBMS or are not under a DBMS at all. These organizations basically have two choices:

■ They can either ignore the relationships and redundancies that exist between different parts of the data base.

■ They can implement and manage relationships and redundancies completely through application coding.

If the relational DBMS is really independent of the physical implementation, then it should be capable of maintaining relationships and redundancies across physical boundaries, including maintaining integrity, security and so on. In this way, the relational DBMS can manage the entire data base as defined by the conceptual model.

Traditional DBMS have done an excellent job as physical data managers. By this I mean managing such areas as integrity, security, recovery and record-format independence for the files over which they have control. However, traditional DBMS force the applications to take on the task of logical data management as well.

That task involves defining how the application's data structures relate to the actual structure and content of the data base. To the application, this means the addition of logic to navigate the DBMS structures to derive the desired application structures.

Such applications suffer from significant problems:

■ They tend to be larger and more difficult to write.

■ The potential for multiple errors is great.

■ Development time tends to be expanded.

■ Applications require larger resource investments.

■ Changes in the data base structure may require reinvestment in applications to enable them to derive the same desired data structures.

■ Applications can only depend on the DBMS for management of the files over which it has control.

Similar problems also exist with most implementations of a relational DBMS. If the only benefit a relational DBMS can provide is the ability to view as relations, or base tables, what we have traditionally viewed as files, then only a partial solution to the problems of logical data management is possible.

Applications may be freed of dependence upon the navigation mechanisms of the physical data manager. However, applications are not freed from dependence on the structure of the data base. Therefore, they will

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Wood is Total Information System's technical product manager for Cincom Systems, Inc.

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from accurate analysis of relational DBMS makeup

still have the responsibility for defining how the desired logical structure is to be derived from the physical data base structure. A case in point could be the moving of price from the sales base table to the item base table. The applications using price must then be modified because of their dependence on the logical structure.

A full-capability, fully relational DBMS should enable the algorithm to operate directly upon derived relational tables. This is in sharp contrast to other relational languages in which the derivation process is specified as part of a query facility, using a relational algebra or calculus.

The algorithm should be free not only to get tuples, or record occurrences, within the derived relation, but also to insert, delete and update tuples within the derived relation. There should be no need for this relation to be redundantly stored to accomplish these operations, and it should be reflected automatically back onto the base tables of the data base by the relational DBMS.

Full integrity should be maintained during these modifications, just as security should be maintained to assure that only authorized users perform only authorized functions only on authorized tables.

Relational DBMS that permit such operations solely upon redundantly stored tables and which do not automatically reflect such modifications back onto the base tables present their users with the same problems a DBMS was acquired to solve: uncontrolled redundancy, serious integrity problems and multiple versions of the truth being used for decision making within the organization.

Relational DBMS that permit such operations only upon the base tables directly, but not upon derived tables, force users to maintain a dependency on and a sensitivity to the structure of the base tables of the data base. This means that the organization will have to go back and rewrite parts of the applications to enable them to derive the same desired data structure from the new underlying base tables.

The ability to enable algorithms to operate directly upon data structures as the algorithms view them means that the derivation process should not be a part of the application at all in a full-capability, fully relational DBMS and must be specified separately.

To be independent of the navigation mechanism of the physical data manager, the derivation process should be specified through relational operators. This specification should only be tied to the application and the physical data manager at execution time. This allows for the most accurate binding possible between an application's desired data structure and the actual structures within the data base.

A full-capability, fully relational DBMS provides a series of important benefits to the organization implementing it, including:

- The ability to develop smaller applications with relative ease.
- Significantly fewer application errors.
- Shortened development time.
- Smaller resource investments in applications.
- Insulation from changes in the data base structure, giving applications a longer life span.
- Application dependency on the relational DBMS to manage the entire data base.

Once you begin to see the advantages a full-capability, fully relational DBMS can provide, the next step is to acquire a system that can actually provide those advantages. However, do not simply take the vendor's word that the system is, in fact, "relational." To paraphrase George Orwell, some relational DBMS are more relational than others.

The minimum criteria for identifying a full-capability, fully relational DBMS include the following:

- The ability to work directly upon derived relational tables.
- Freedom from restrictions on retrieval only, regardless of the number of underlying base tables.
- The capability of reflecting inserts, updates and deletes to derived tables automatically onto the appropriate base tables without update, insert and delete anomalies and automatically enforcing data base integrity.
- The capability of managing the entire date base, including redundancy, integrity, security and recovery, even if the physical data involved is stored within different data managers.

Additional factors to consider are the availability of such features as query languages, end-user facilities, decision support tools and fourth-generation languages for application development.

Software technology has made great strides since the concept of a relational data base was first delineated in the early 1970s. Unfortunately, many systems currently being marketed with a "relational" label are subject to the problems outlined above.

The buyer of a relational DBMS should be aware of these claims and demand proof from the vendor making such claims. Look carefully at the system to make certain that it conforms to the accepted definitions of the term.

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Don't let application mix neutralize DBMS power

By Robert J. Dickey
Special to CW‡

The value of data base management systems (DBMS) in applications development has been recognized for a long time in the data processing community. In fact, development of applications is the predominant reason given for purchasing a DBMS. Control of the data, integration across applications, recoverability and flexibility are all cited as factors in using DBMS technology in applications development.

Dickey is a senior systems engineer based in Minneapolis with Culinet Software, Inc., a vendor of mainframe software.

As long as the DBMS was not a factor in user selection of software packages, the application packages tended to be selected based solely on a features and functions basis.

With the addition of productivity-enhancing facilities, a DBMS becomes even more powerful in the hands of the developer. A fourth-generation language, query tools, integrated dictionary and report writer all contribute to the ability to achieve better and faster results in providing applications.

On the other side, what has been the trend in applications software? It has been toward purchasing standard packages from software vendors, and with good reason. Why reinvent the wheel? As the body of knowledge has grown about the needs of specific industries and business groups — production, finance, personnel, banking and so on — software packages have been developed and marketed to meet those needs.

Application system users now have a wide variety of packages aimed at their specific needs, ready for installation and with full documentation and vendor support. With the breadth of the offerings now available, there is little validity in or payback from in-house development of any but the most unique of software applications.

Neutralizing tendency

The dichotomy that has risen from the above is that there has been a tendency to neutralize the power of the DBMS through the applications selection process. Most standard application packages have been written to function with DBMS independence from to open up a larger market for their potential use. They are written in Cobol and use some form of DBMS interface to convert the application calls to the particular DBMS calls. The result is a deintegration of the application from the DBMS and from many of the facilities of the DBMS that formed the basis of its justification in the first place.

As long as the DBMS was not a factor in user selection of software packages, the application packages tended to be selected individually or in small groups, based solely on a features and functions basis. The net result, however, was usually disappointing. The selected applications were foreign to one another. Integration was not achieved and, in many cases, data redundancy was required. Data processing spent much of its time writing interfaces and bridges with no incremental performance improvement at the business level. When end users requested changes or extensions to the applications, a great deal of front-end analysis was required even to determine the extent of the system changes required; and once identified, the changes had to be applied using the original source language. Attempts at using a fourth-generation language with an existing application were thwarted by lack of integration, and if a specific application included a fourth-generation language, it only applied to that package, not all application packages.

Today there is an alternative that more and more application users are choosing. That is the selection of applications software designed not only to meet the functional end-user needs, but which is also designed and written to utilize a specific DBMS and all of its inherent power and facilities.

Applications can be developed using the DBMS fourth-generation language and related facilities such as on-line mapping. Maintenance as well as in-house extension of such a systems is greatly facilitated. This significantly reduces the queue of user requests in data processing, letting the system grow and change with the business needs.

Using a common data base eliminates data redundancy and its by-products of reduced accuracy and timeliness. New, unique in-house-developed applications will use the same data base and language, and they, too, will be fully integrated with each other and with the purchased applications.



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SPECIAL **REPORT**

Homegrown system handles firm's environmental data

AURORA, Colo. — Supervisors of environmental programs at the Rio Blanco Oil Shale Co. (Rbosc) here are managing large amounts of data with a data base management system developed in-house. The Environmental Affairs Department Data Management System (EADDMS) is used to compile, report and analyze environmental data essential to the eventual commercial development of oil shale as a petroleum resource.

The SAS system of software products from SAS Institute, Inc. was key to the EADDMS design. Rbosc selected the SAS system for its flexibility in handling large amounts of data and for its graphics, analysis and reporting capabilities, said Guenton C. Slawson, manager of the company's Environmental Affairs Department.

The base SAS product is used almost exclusively as a data manager and analysis/report generator for the EADDMS system. "The unique SAS programming feature for maintaining and updating multiple SAS data sets has saved considerable expense and aggravation that is associated with the management of a project this large," Slawson said.

The Environmental Affairs Department maintains and analyzes master SAS data sets comprising data for five major areas: hydrology, air studies, terrestrial ecology, aquatic ecology and research programs. IBM's Clist control language is used as the EADDMS manager.

Before the development of EADDMS, the data for these environmental programs was processed by various outside consultants. This often resulted in multiple, undocumented formats and cumbersome editing and analysis of data, Slawson said.

EADDMS consists of four components: data collection, data entry and editing, master file update and file maintenance and analysis and report generation.

Field specialists and program supervisors code data on program-specific field coding forms. These forms are designed to facilitate the data entry efforts and to provide the person coding the data with a simple, concise form. Whenever possible, field forms are generated by EADDMS to reduce further coding and data entry.

Quality control

Initial data entry and quality control for all programs are usually completed by one employee using the company's Harris Corp. 1600 distributed data processing system. The base SAS product is used to generate quality-control check prints to review and edit data entry errors. A format libary checks for incorrect coding.

Program supervisors are asked to review the initial screening of the data to verify completeness and accuracy. The error rate, using the program-specific field coding forms and the quality-control check prints, is less than 1%.

Each master SAS data set has an associated file maintenance, or updates, program. SAS variables are created and stored in master SAS data sets through the updates program. The data sets are easily accessible for file maintenance activities.

"EADDMS is a dynamic system that can be modified and expanded to meet the changing needs of each supervisor," said Marji Randall, coordinator of the data management system for the Environmental Affairs Department at Rbosc.

Data analysis and reporting applications are unique to each program segment. Supervisors expand the number of applications programs within each segment as they learn more about the application resources available. For example, the SAS/Graph product is used in the air studies program to plot meteorological and air pollution data in multiple colors.

Data listings, summaries, appendix listings and simple statistics are generated as printed reports, which are coded using the base SAS product.

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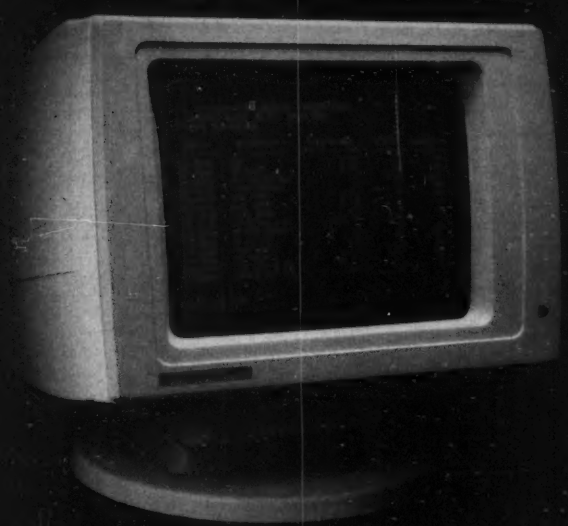
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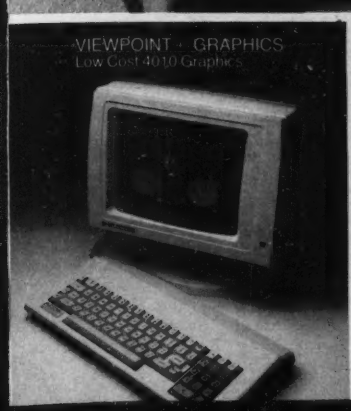
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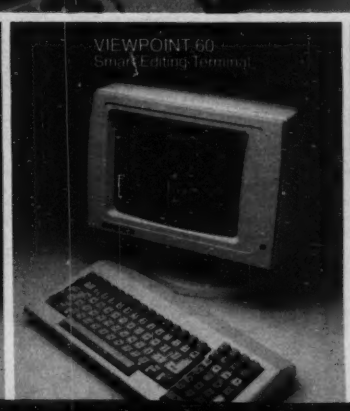
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Insurance firm's mass marketing sector reaps gains

CHICAGO — Corporate management at a large insurance company here issued a tough ultimatum to its mass marketing staff: Find a system to handle internal processing, management said, and get it up and running before an upcoming policy implementation begins.

"When I told my staff we had to have an in-house, new business processing and management information system operational in four months, they said it wasn't possible," said George Hunter, senior vice-president of Bankers Life and Casualty Co.

But the staff managed to bring up the system it chose, a supermini running an application development language and integrated relational data base management system (DBMS), in just over three months. And the system has been saving time for Bankers Life's mass marketing division ever since.

The mass marketing division of Bankers Life offers various insurance plans to the general public, reaching prospects through mass marketing techniques.

This relatively new division recognized from its beginning three years ago the special systems needs of a direct-response distribution operation and so acquired its own divisional data processing capabilities, according to Chris Mlot-Fijalkowski, manager of marketing services administration.

The primary goal for the new system, brought up in early 1983, was to provide about 25 users in the new business processing and underwriting departments with an on-line interactive system for processing insurance applications on a real-time basis, he said.

Secondary, but equally important, objectives were to off-load divisional reporting functions from the corporate mainframes and to design an on-line management information system that would track daily new business activity.

Sam Serio, director of underwriting for the mass marketing division, explained, "We needed a system to process large numbers of insurance applications with very few people and fast turnaround. During the heavy months, we drop as many as four million direct-mail pieces. The underwriting system had to allow us to process more than 1,000 valid applications a day and to issue policies on 85% of those. We also needed faster and more detailed reporting capabilities than we could get from the corporate DP shop.

Early into the investigation for a new system, the department decided to place primary emphasis on the application development software. The following criteria were used:

- Must provide fast program development.
- Must be an integrated DBMS capable of supporting hierarchical and relational file structures.
- Must be capable of developing sophisticated applications.
- Should offer personal computing facilities for non-DP personnel.
- Should not require an extensive DP staff to manage and support the system once installed.

After investigating several software alternatives, Bankers Life chose Rexcom, an application development language and integrated relational DBMS from Rexcom Corp. and a Prime Computer, Inc. Prime 750 superminicomputer with 2M bytes of memory and 1.2G bytes of disk capacity.

Added benefits

The department found that the system not only met all the previous criteria, but provided several distinct features not originally considered, according to Mlot-Fijalkowski.

"After looking at Rexcom in-depth," he said, "we found that the real power of the system revolved around its fourth-generation application development language and the DBMS' capability to create and establish new relationships without any prior definition."

Mlot-Fijalkowski explained that because mass marketing is a dynamic field, where new ideas must be implemented before they become stale, the ability to establish relationships quickly is crucial.

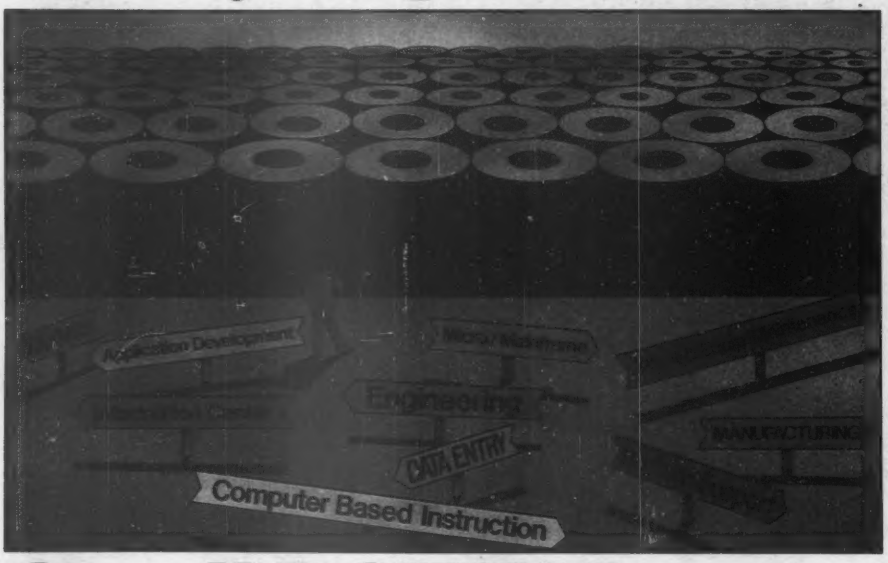
He said the department was also impressed with the language's ability to modify itself during program execution. "This feature allows us to develop applications that are data-driven, which are far easier to maintain and modify than those developed under traditional hard-coding techniques."

Bankers' initial success with the automation of its underwriting, direct-mail processing and reporting systems was encouraging, he said.

The department was able to develop an on-line insurance processing system in a fraction of the time that would have been required using conventional programming tools, Mlot-Fijalkowski said. From optical scanning of applications through 200 file and table comparisons and auditing programs to printed policies and management reports, development required less programming man power than originally anticipated.

Before he acquired the system, Mlot-Fijalkowski had expected to require the services of two systems analysts and at least three or four programmers. But he said the DBMS has been self-supporting; he keeps one

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after installation of DBMS-based processing system

contract programmer on call for development and maintenance.

Rexcom's performance in an actual transaction-driven production environment was as important as applications development. With the department's two main data bases approaching almost 300,000 records each, data base access performance remained excellent, he said.

Serio, a longtime insurance underwriter, has had a good deal of experience with insurance automation. "The real difference I [have] found was the strong prototyping environment provided by a relational data base and fourth-generation language. This allowed us to work with the programmers right from the beginning. We were able to implement a large number of edits and table or file comparison validations up front."

Rexcom and the Prime machine, however, have brought the underwriting department some measurable productivity gains, he said. "We have reduced policy insurance turnaround from 4½ days to 24 to 36 hours. The productivity of our underwriters has increased over 250%."

He explained that whereas one underwriter could previously process 100 cases a day, with the new system the same underwriter can process between 250 and 300 cases in the same amount of time.

Good user response

New business Processing Manager Dan Gorelik, who is responsible for data entry and system design and maintenance, said users have responded well to the system. "The screen painting capabilities allowed us to create user screens that look almost identical to the actual forms that they work from. We have also implemented a large number of field-by-field edits and table validations. The result has been a significant decrease in data entry errors and higher user satisfaction."

The data processing side of the house has also found many benefits, Gorelik said. "From a system maintenance perspective, Rexcom's flexibility has been a godsend. Not having to worry about defining records, opening and closing files and recompiling is really wonderful."

Before the system was installed, he said, creating a new policy type required the work of two people for two to three weeks. "Now, it takes one person half a day."

Bankers Life recently decided to implement payments by credit card. "We had not taken a credit card payment system into consideration during the initial system design and had no way to deal with it in our applications," Gorelik said. In one week, his staff designed, coded and implemented the entire payment system.

He attributed such time savings to the use of tables rather than hard coding for running applications. "If we want something new, we just add a new table. And to establish new relationships between existing or new files is a snap. There are no major data base reconstructions or program rewrites to worry about and no pointer chains to lose."

Gorelik said he has also been pleased with Rexcom's reporting capabilities. Each morning, management can review the previous day's results. Equally important, the system's ad hoc reporting capabilities allow review by market, policy type, geographic area or date or by any other variables management desires, he said.

Reflecting general management opinion, Serio said, "In the past, we got reports on a weekly basis and they really provided little useful information. For detailed, full-blown reports, if we submitted the data in March, we were fortunate to receive the results in September.

"Now we get the information in the format we want, when we want it," he said. "A data base with powerful on-line query capabilities can really provide management with very effective analytical tools."



Larry Koranda, manager of information systems, along with Serio and Gorelik, reviews Bankers Life and Casualty's on-line underwriting application.

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Relational vs. traditional argument misses essential

By Jeffrey Stamen and William Costello
Special to CW‡

The controversy over the applicability of relational vs. traditional data base management systems (DBMS) has raged for well over a decade. On the one hand, advocates of the relational data model articulate its power, generality and flexibility for solving almost any data management problem and point to its productivity and maintenance advantages. On the other hand, representatives of the MIS/DP community point to the continuing practicality of traditional DBMS for solving operational data processing problems.

This debate, however, often misses the underlying issues relating to the applicability of different kinds of DBMS. While a discussion of the efficiency and scope of features of a particular approach are certainly appropriate, both sides of the issue tend to ignore the deeper question: Is the same kind of DBMS suitable for all kinds of applications and data?

MIS faces a number of dramatically different types of applications best handled by using DBMS with different data models and different implementation strategies. A single DBMS approach is simply not suitable for the full range of MIS needs.

To see why this is true, let us consider the familiar pyramid representing the three broad classes of application types.

Going from the bottom up, operations applications support the day-to-day functions of the business; management tracking applications help management to determine the status of the business and to control the operations of the company; and decision support systems (DSS) applications are those that support longer range or more global planning and decision-making activities.

Many characteristics of data usage divide clearly across these classes of applications.

Operations data tends to be very detailed, corresponding to lower levels of data collection in the organization. For example, how much is on a particular purchase order, or what are the inventory figures for a particular part?

Conversely, data needed for a DSS application is typically summary data. You want to know your accounts receivable's position for the last few months, not for a particular vendor, but in the aggregate. Or you may wish to know your cash position for the same time horizon.

Current data is the dominant concern in operations applications. As you bring in DSS applications, the emphasis broadens to include historical data and then future data.

The structure of operations data bases is usually static. Once you figure out how to do an accounting system, you rarely change the files or fields, and you seldom change the transactions. As you proceed up the pyramid to DSS applications, it becomes more difficult to prepian the data structures or to anticipate all the possible ways that the data will be looked at.

You often will change the data structures fundamentally — that is, the variables, fields or files that are used. In short, you have to create new data structures on the fly as you consider the data from new perspectives. Thus, for DSS, you need a much more dynamic system, one that can easily restructure the data base during interactive analysis.

The nature of the data in operations systems is typically unidimensional, or file-oriented. The data consists of linear lists of related values, each describing an entity — a collection of records. DSS, in contrast, tend to require multidimensional data structures. The user wants to work with all the possible combinations of key values, because the data needs to be looked at across each dimension. Even deviations from completely dense arrays of data (not all combinations of keys) are interesting in these types of applications.

Data base orientation

Operations data bases are essentially oriented toward representing all or some of the information about one or more entities. Most of the procedures in the application involve the addition, deletion, updating or reporting of individual or sets of records. For example, in an operations system, one is concerned with entering into the system all the attributes of a part or retrieving the accounts receivable balance for a customer.

Data bases for DSS, however, tend to be oriented toward manipulation of one or more fields (or table columns) across all entities as the basic unit of access. In these systems, you are more concerned with the relationships among fields, such as a correlation between advertising dollars and market share for all products.

Aggregation, or the summarization of a field, is a frequent activity in DSS. This goes beyond mere totaling or averaging and includes such procedures as trend fitting. Summary values may be factored down to more detailed levels, as in a budget allocation procedure.

So many major differences exist between the application classes that the effects of a particular DBMS approach on performance and user satisfaction can be significant. For maximum effectiveness, a DBMS ought to

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point: No one approach solves all needs



be optimized for the data requirements of the class to which that application belongs: operations, management tracking or DSS (planning and analysis). These requirements affect the design of DBMS in two areas: the data model and the implementation strategies.

The DBMS data model is a classification of its basic data structuring capabilities, along with the language mechanisms for manipulating those structures. It is the principal factor that determines how users can look at their data. Traditional DBMS tend to follow either the hierarchical or network data models, models the relational advocates argue are not good end-user views of data.

Even if it is relational, is the same data representation appropriate for all problems? The advocates of the relational model concede the inadequacy of this approach for certain problems. For example, artificial intelligence problems require greater ability to represent knowledge of the application world than the relational model can provide.

However, it is not necessary to look at the rather esoteric field of AI to find applications for which the relational model is not well suited. Consider spreadsheets, used today in both business and government.

Specific applications

Some specific applications in decision support are financial modeling, sales forecasting, strategic planning, acquisition analysis, investment analysis and marketing analysis and modeling. These applications have been resistant to implementation with traditional or even relational DBMS, except where simple ad hoc reporting has been the major component. They have not been successful in those DSS applications in which analysis or modeling necessitates different ways of looking at the data.

One of the distinguishing characteristics of DSS data is the need for multidimensional data representation. For example, a spreadsheet is often used for financial planning where financial line items go down the page and time periods go across.

Data structures are not the sole reason that DBMS constrain users in their thinking about the data; the language used to access and manipulate the data also determines how users can operate on the data. With both traditional and relational DBMS, users are required to think in terms of processing sets of like records through the table view of data.

Even a data structure as general as relational tables (or files) does not necessarily represent how people need to look at or manipulate their data for all types of applications.

There is no reason why a given DBMS could not be optimized for a particular application. However, when a DBMS is designed for transaction processing, it tends to perform poorly for other applications such as DSS. Transaction processing requires very rapid access to a single record containing a number of data items that describe an application entity.

On the other hand, DSS applications tend to require very rapid access to an entire array of homogeneous data (one data item or field across all entities) to perform summarization, forecasting or correlation. These are conflicting objectives for the physical structuring of data. Most DBMS are internally optimized for very efficient record processing, while few DBMS are designed for very efficient array processing. It is hard to make the same system do both well because they each require radically different storage, accessing and processing strategies.

Theoretically, DBMS designers could provide such a wide range of storage and access strategies in one DBMS. But no system today even comes close to this goal. The problems of software complexity, size and performance of the system, as well as ease of use by data base administrators, are formidable challenges for the future. For now, prudent MIS directors should carefully consider the need for multiple DBMS.

It is important for MIS, in service to its user community, to provide a selection of DBMS products, each designed for a major class of applications. When doing a DBMS evaluation, the question is not which product is best, but which is best suited for which type of application.

Stamen is a senior vice-president and Costello is a product consultant with Management Decision Systems, Inc. of Waltham, Mass., a vendor of DBMS and application products for decision support systems.

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Choose carefully — DBMS can significantly impact business

By Henry J. Meyer
Special to CW‡

Intense application development pressure building in many organizations over the past few years — in some cases, to near-crisis levels — has forced management to find ways to increase applications development capability with the same number (or fewer) of hard-to-hire developers.

A data base management system (DBMS) is capable of advancing an organization from antiquated, uncoordinated, conventionally developed applications to the DP state of the art within the first year or two of installation. Three factors combine, however, to make evaluation and selection of a DBMS product and vendor a crucial and demanding task that can permanently and substantially affect the conduct of business:

- The DBMS market is large, competitive and generally high-quality.
- Commitment to a specific DBMS product is very difficult to reverse.
- The development power and performance characteristics of DBMS products vary substantially and are often designed to solve specific sets of user requirements.

Before a major DBMS commitment is made, make sure that one of several alternatives will not serve your requirements (at least for a few years). Among them are:

- Data management systems.
- Application packages that serve specific functions, such as accounting or manufacturing.
- Statistical analysis or decision support systems that incorporate basic data management capabilities.

A DBMS will be installed to serve the particular set of requirements of an organization. One set might be to provide easier access, manipulation and output from an existing group of master files (which themselves might be under the control of another DBMS). A different set could require a DBMS to provide a corporatewide foundation for all future DP development and operation (that is, a full migration to the DBMS). Several other general sets of requirements of a DBMS are realistic.

Many DBMS products are oriented toward one or another DBMS market segment. Products directed toward different market segments can vary widely in ease of use and features and can vary their data, program and user access components.

There are more than 300 DBMS products on the market from over 200 vendors, implemented on computer systems ranging from microcomputers to mainframes. Most DBMS products, however, operate on a limited number of hardware vendors' computer models and operating systems.

An organization without a commitment to a specific hardware vendor might do well to defer that decision, thus widening the field of DBMS products to choose from.

The time available to conduct a DBMS evaluation and selection study is finite. Ideally, this time will be divided unequally among all eligible candidates — more time on more desirable products and vice versa. To accomplish this, a multitiered approach works well.

A full field of 10 to 20 candidates, for example, can be halved based on hard limitations of the products, such as maximum number of data bases and their sizes, maximum number of concurrent users and updates and hardware resources required (main memory, disk space and so on). This information can generally be found in the literature. The next tier can be reached after discussions with the vendor and with a few users of each of the contending DBMS — users with requirements comparable to your own.

Pick the user's brains

The single best source of information on a specific product is its most experienced and sophisticated user. Brief discussions with MIS and end-user representatives at a few such installations will sharpen your research focus. Also important at this stage is a close look at each remaining product's set of user manuals. The last tier should include only two or three final candidates. If time and timing permit, attendance — as a prospective user — at a regional or, preferably, national users' group conference for each finalist product is worth the expense. A majority of computer product users are both knowledgeable and candid. Strong vendor resistance to this idea should be considered suspect. Keep in mind, though, that no product is — or ever will be — perfect in every respect.

Involve all study participants — systems and applications programming, computer operations, end users and a management/executive review panel — in ranking the finalists. To demonstrate the features and capabilities of the No. 1 candidate, a benchmark test can be conducted, preferably using complete files of the organization's own data.

A limited-resource benchmark test is incapable of fully testing a comprehensive, full-feature DBMS. Hence, a benchmark test should validate the DBMS product/vendor selection decision rather than be used as a factor in making that decision.

Meyer is an independent consultant based in Norwalk, Conn.

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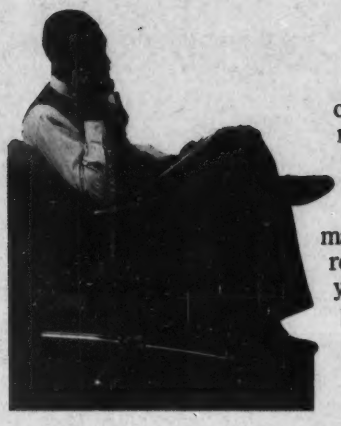
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SPECIAL **REPORT**

Fluid-handling technology firm brings up on-line info

MINNEAPOLIS — Although the information center approach to data processing has become closely linked with Fortune 500 companies, these are not the only organizations that can harvest the rewards of centralized data processing and an active user base of managers with little DP experience.

Graco, Inc. here is a $140 million company that successfully established an information center to satisfy end-user computing needs and to make more efficient use of its accumulated corporate data.

A leader in fluid-handling technology, Graco specializes in developing, manufacturing and marketing quality-engineered equipment for high efficiency in moving and applying fluids and semi-solid materials. Its product line of more than 700 items and custom-designed systems is used by many types of manufacturing and processing industries around the world.

Graco's original information processing systems were based on a management structure that had been in place for years. The computerized analyses and reports available were standardized and had been programmed to meet a centralized operating structure.

However, in 1981, the company decided to provide managers with on-line computer power to help increase their divisions' productivity and efficiency.

"As part of our annual systems planning process, we took on the task of studying the feasibility of developing an information center to meet management's and production's information processing needs," said Steve Kuhlmey, corporate systems manager at Graco.

The information center appeared to be a viable solution for Graco, and by April 1982, the corporate systems group developed the justification for an information center from a business standpoint. Using what he terms admittedly subjective but conservative estimates, Kuhlmey identified four factors that were the basis for establishing Graco's information center:

- Improve sales revenues through better market and sales analysis while providing better customer service.
- Provide considerably more data and analytical capabilities for corporate management.
- Increase managerial productivity.
- Reduce information systems backlog by giving users direct access to corporate data and analysis tools.

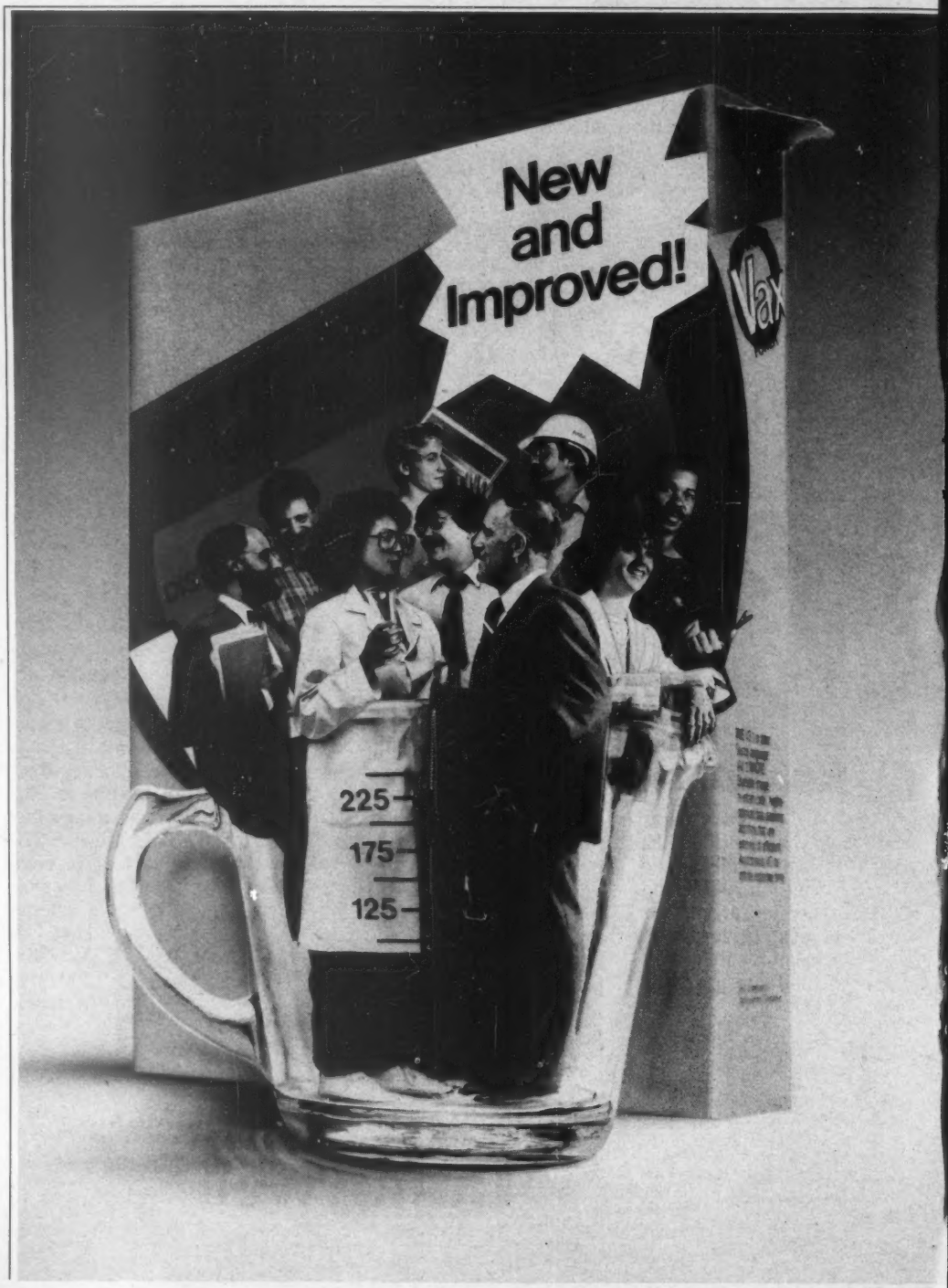
In addition, the information center controlled demand for microcomputers. "Since we aren't a large corporation, we wanted to avoid purchasing numerous standalone micros because that solution wouldn't provide the return on investment or the processing power or functionality to access our large data bases," Kuhlmey said.

The first and most critical step that Graco faced was selecting the right end-user software on which to base its services.

When Kuhlmey, senior information analyst John Green and the steering committee chose the software for Graco's information center, the key product capabilities rated were as follows:

- Ease of access to corporate data files.
- Ease of editing.
- Flexibility in data base design and data structure.
- The quality of the training programs supplied for both the end user and DP professional.
- Security features.
- General ease of use.
- The availability of automatic administrative features built into the system.

After rating each of the most likely products, the three top contenders were D&B Computing Services Co.'s Nomad2, Mathematica Products Group, Inc.'s Ramis II and Information Builders, Inc.'s Focus. Weighing the capabilities of the three, Kuhlmey and Green focused on Nomad2's flexibility and what they considered its



center to handle data, improve managers' efficiency

edge in end-user-friendliness. Kuhlmey proceeded to prepare a recommendation to the steering committee that was overseeing the software evaluation process to purchase Nomad2.

At this point, Nomad2 faced a major test. Graco's manufacturing organization had a preference for another software product, having used it on a trial basis to simulate work load profiles based on equipment production requirements.

With the help of a Nomad2 specialist from D&B Computing, Graco put together a prototype application to do the same simulation. The results met the plant managers' expectations, and then a proposal to purchase Nomad2 and establish an information center was prepared.

Graco's senior management reviewed the proposal and gave approval for the purchase. By early December 1982, Nomad2 was delivered to Graco and installed on one of the company's mainframe computers for preacceptance testing.

Kuhlmey and Green, the two Graco employees who became responsible for information center operations, went through three days of product training conducted by D&P Computing's office here. Both were comfortable with the product by the end of the three days.

In early January 1983, the first group of 11 end users began their three days of training. By the end of the period, which included classroom discussion, hands-on terminal practice and on-line tutoring, the students were preparing simple, practical applications that they could use in their individual jobs.

But then the students went one step further. Three end users from marketing went back to their department after learning the basics of the system and immediately showed other department members how to access and use the applications they had built soon after the training session. In a matter of days, members of marketing were utilizing the information center service.

By June of this year, Graco had nearly a hundred employees regularly using the information center. Kuhlmey's conservative estimate is that Graco will have more than 200 end users on the system by the end of 1984, out of the firm's total of 1,500 employees. The current IBM 3083 handling the information center also is used for the company's traditional on-line CICS, applications development, batch processing of production data and an engineering application for developing numeric control machine programs used in the manufacturing operation.

After it had been in operation, Kuhlmey saw the positive impact of the information center. The marketing department's sales monitoring application immediately saved five hours per week in the preparation of reports. And plant order filling accuracy improved nearly 30%.

In addition, some ambitious applications have been written by end users with the guidance of Kuhlmey and Green. Graco's traditional product pricing program has been converted to the Nomad2 information center. The procedure is now completed in half the time previously required.

Projects currently under way include a data dictionary that will support the DP staff's systems analysis efforts and reduce analyst and clerical time spent in updating previously developed documentation. They are also working on a sales forecast simulation for end-user applications.

When asked who should consider an information center, Kuhlmey cited three criteria that have little to do with a firm's net revenues.

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System gives lift to migrating whoopers

GRAYS LAKE, Idaho — When whooping cranes take off from here some time within the next few weeks, most of the birds should arrive safely at their winter home in New Mexico, save for one obstacle — power lines.

Since 1981, six whoopers from the flock have died en route between their summer grounds here and their winter grounds in Bosque del Apache, N.M., after they hit power lines in one area of Colorado alone. Other lines elsewhere have added to that toll. The total world population of whooping cranes is about 105.

The Grays Lake-Bosque del Apache flock, which includes about 30 birds, represents man's efforts to help the whooping crane recover from near extinction.

Each spring, biologists like Roderick Drewien of the University of Idaho transport crane eggs to Grays Lake from a captive flock of whoopers in Maryland and a wild flock managed by the Canadian Wildlife Service. Here, the biologists substitute the eggs for some of those in the nests of populous sandhill cranes. Sandhill parents hatch the eggs and care for the young whoopers as their own offspring.

When whooper chicks survive to become old enough to fly, their main threat is power lines, according to Elwood Bizeau, Drewien's colleague at the University of Idaho.

A project proposed by a group within the U.S. Fish and Wildlife Service (USFWS) aims to help prevent additional lines from going up in the path of the endangered birds and to organize other critical information about the cranes. The project centers around a prototype data base assembled last winter and a commercial data base management system (DBMS).

The Whooper prototype data base was designed under the direction of Duane Asherin, group leader of the Rapid Assessment Methods Group of the Western Land Use Team in Fort Collins, Colo. The group collected observations reported by biologists in the field from 1975-82 on four birds from the Grays Lake-Bosque del Apache flock and loaded these observations into the data base.

The Whooper data base consists of 160 observation records, each containing 26 items. Infocen, a DBMS from 3CI, helps biologists manage and analyze the information.

Replaced manual searches

Until Infocen was applied to the whooping crane data, environmental impact questions, such as where power companies should place new lines to avoid hazard to whooping cranes, were answered using manual searches through stacks of handwritten data, Asherin said.

The method was cumbersome and time-consuming. Whenever a power company had a question about the impact of a proposed construction, it had to wait as long as six weeks for an answer, Asherin said. Much of the wait involved drawing Drewien away from his fieldwork with the sandhill and whooping cranes to sort through data and analyze it.

Tracking down Drewien in the field is a task in itself. He has no home base and works from day to day wherever the whooping cranes happen to stop, Asherin said. "He's a migrator like the cranes are."

Asherin, who studied with Drewien at the University of Idaho, proposed the DBMS both as a solution to the delays and as a tool for Drewien to use to help him manage flock information. "I knew Rod was having some problems analyzing that data," he said.

Asherin's group brought up Infocen on a Data General Corp. Eclipse MV/4000 with 4M bytes of memory and 300M bytes of disk capacity. It also made use of a Digital Equipment Corp. VAX-11/780 at Colorado State University in Fort Collins.

Information entered into the data base included bird identification and age; observation data; state, county and refuge location; latitude and longitude coordinates of observation; sighting duration; and seasonal status of the observations.

Asherin said Infocen provides access to this information to answer questions concerning the impact of specific development activities on the cranes' survival.

When the DBMS is implemented on a full scale, he said, the USFWS will be able to generate impact statements within an hour real-time, and power companies will have the results within a day or two.

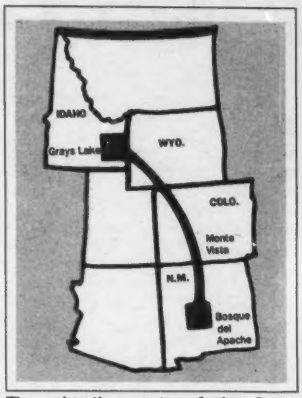
According to Conrad Fjetland, USFWS assistant regional director for endangered species in Albuquerque, N.M., the wildlife service has been investigating the possibility of setting the system up in fiscal 1985. "I fully expect to see us working with it this time next year," he said.

When the data base was being developed last winter, Asherin said, power companies' potential energy development impact questions were kept in mind.

Infocen's export facility, which passes subsets of data from the whooping crane data base to external files in a form specified by USFWS users, allowed information from field observation to be entered into the USFWS' Map Overlay and Statistical System (Moss), which provides a spatial display of geographic data.

An Infocen command exported all data records from the data base to an Ascii file. Moss used these files to identify map points that corresponded to the exported record coordinates. Moss read these files to create a map showing the crane observation points in relation to other resource and institutional boundary information.

By selecting these observations by date, biologists can trace sightings chronologically to follow changes in the cranes' migratory route, Asherin said.



The migration route of the Grays Lake-Bosque del Apache whooping crane flock (arched line) crosses through an area around Monte Vista, Colo., which has a high concentration of electric power lines.

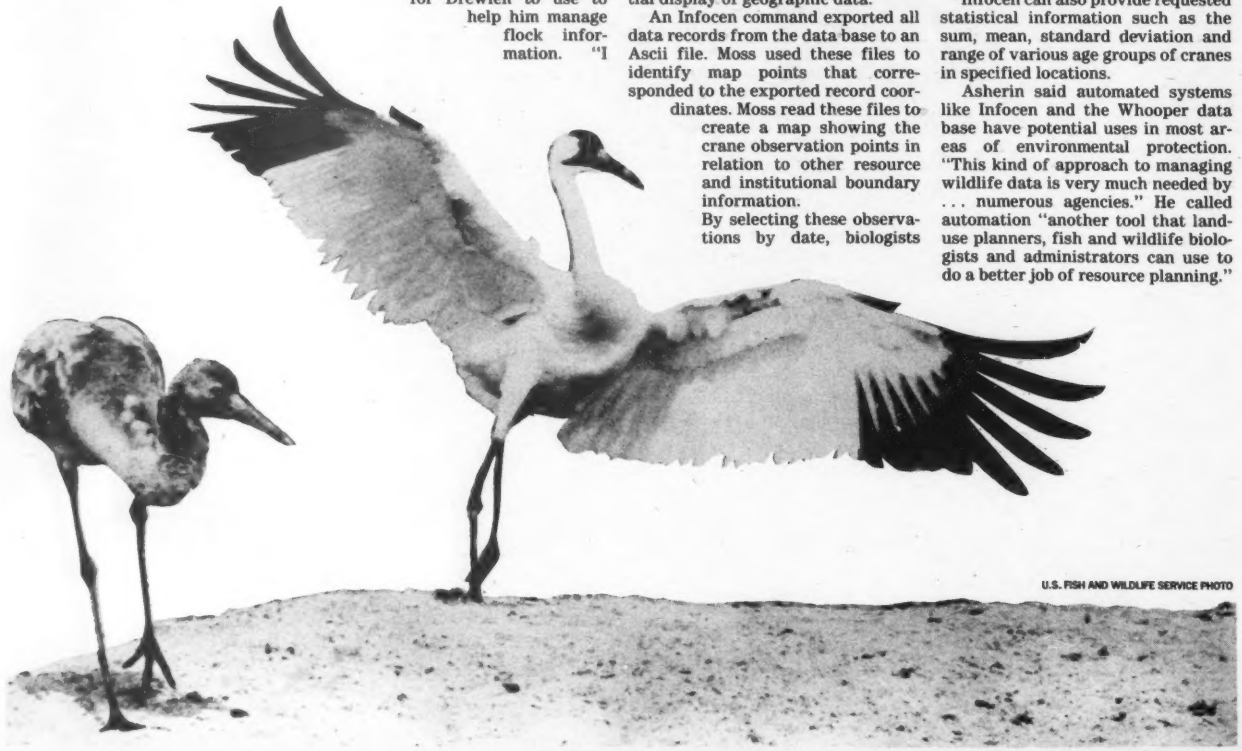
Species management

In addition to helping with environmental impact questions, Infocen helps with species management, he said. For example, by using the same method that tracks the cranes' route and selecting observations by bird identification numbers, biologists can monitor an individual bird's activities.

Infocen's query capabilities reside in NSQL, a fourth-generation English-like query language. Retrieved data can be presented in a variety of formats, including the display of selected items, such as a list of information on one specific bird, or the display of subsets of records, such as the available data on all birds sighted in a specified state, county or refuge.

Infocen can also provide requested statistical information such as the sum, mean, standard deviation and range of various age groups of cranes in specified locations.

Asherin said automated systems like Infocen and the Whooper data base have potential uses in most areas of environmental protection. "This kind of approach to managing wildlife data is very much needed by . . . numerous agencies." He called automation "another tool that land-use planners, fish and wildlife biologists and administrators can use to do a better job of resource planning."



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Fourth-generation program automates Dallas bank

DALLAS — The Federal Reserve Bank of Dallas here, one of 12 regional banks of the U.S. Federal Reserve System, is using a fourth-generation data base management program to automate a variety of major bank activities.

The bank is also the headquarters of an Automation Program Office, which coordinates the research and development of computer applications and communications networks for the entire Federal Reserve System. As such, the Dallas bank has implemented a fully integrated office of the future, combining fourth-generation language technology with office automation and micro-based spreadsheets. Information Builders, Inc.'s Focus, a fourth-generation data base management program, is a key player among the blend of technologies the Fed uses to automate major bank activities efficiently.

Used throughout most of the Federal Reserve System for end-user computing, Focus is taken a step further in Dallas. Led by an information center team and backed by top management's blessings, the Fed has implemented a scheme that allows users to build menu-driven applications, download the data into Lotus Development Corp.'s 1-2-3 spreadsheets at executive workstations and blend this data with word processing and electronic mail technologies.

Blending of technologies key

To execute this scheme, users draw upon data residing in Focus data bases or accessed through Focus' ability to read external data bases. Information center manager Ron Elswick said the blending of technologies was key to the success of end-user computing at the Fed. "It's the combination of technologies that really is key here," he said.

Vice-President Bill Dusek added that by providing access to the mainframe, office automation and standalone computing as well as to outside data base services such as Dow Jones & Co.'s News & Retrieval Service, the integrated system serves as a versatile tool for end users.

At this point, only about 80 professional and managerial users have been trained in Focus through the information center. Each person trained has had a specific project to complete that should enhance each department's operation.

Hardware consists of an IBM 3084 mainframe, six IBM 8100 series small business computers used for office automation and approximately 170 IBM 8775 smart terminals and IBM Personal Computer XT microcomputers used as workstations.

At this point, only 80 professional and managerial users have been trained in Focus. They have had specific projects to complete that should enhance each department's operation.

Basil Asaro, assistant vice-president in the holding company supervision department, is responsible for ensuring that all mergers, consolidations and acquisitions among bank holding companies are analyzed and approved or rejected on time.

Because of the statutory processing limitations, timing is critical.

An on-line system was developed in Focus to eliminate all manual tracking of the 661 holding companies currently in the 11th district. The accompanying log books and card files stored in offices were replaced with menu-driven Focus reports and ad hoc queries for information stored in Focus data bases.

"We process more paper in this department than any other department, and we used to keep it," Asaro said. "Duplication of effort has been cut down considerably, and that's another time-saving factor. This, combined with office automation, has significantly enhanced our ability to meet deadlines." Future plans include sending key reports to other branches through IBM's Distributed Office Support System electronic mail system.

Split off from the larger Data Services Department, the information center is composed of a group of 10 professionals who provide technical support and training in the three core areas of mainframe-based, end-user computing, office automation and executive information systems.

Elswick pointed to the budgetary system as a prime example of what has been accomplished with Focus and end-user computing. A critical requirement for the Fed two years ago, the budget system was projected to require six man-years with Cobol and IBM's IMS, he said. "Using Focus, a functional system was implemented in 35 work days. After using the system for a couple of months, the system was enhanced and three man-months later, there was a comprehensive product, finished in less than one man-year. Complete financial models, which used to take six days to produce results, now produce results in 45 minutes, he said.

Larry Baxley, information center project leader, has worked with end users to develop applications for more than two years. Baxley and Nancy Lamb, another information center consultant, developed a system called Posse, which allows end users to select and execute user-developed programs from menus. With Posse, once a user develops a system, it is available to users in other departments. A separate security data base using full Focus security and encryption ensures that access to these systems is restricted, controlled and maintained by the information center.

Another advantage Fed management found was in prototyping systems. "Users can sit down and play with their applications and make the changes that they want before the system goes into production. We are dispersing the use of the computer into the end-user community with tangible results," Dusek said.

Assistant Vice-President Jesse Sanders used Focus in the bank's loan department to replace a manual collateral system controlling over $1 billion worth of collateral.

The third prong of support the information center offers is building micro-based executive information systems for decision support. Each senior vice-president has an IBM Personal Computer in his office. Data is downloaded from mainframe Focus files for use in 1-2-3 spreadsheets, along with information services such as Dow Jones. This makes critical operating data available directly to executives, without prior manipulation by employees.

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Tool lets national chain streamline financial reporting

CHICAGO — The financial bottom line for Jewel Co., a multibillion-dollar food and drug chain, lies hidden somewhere in a bottomless pit of numbers: one manufacturing firm, 1,100 retail stores, nine operating companies, four geographic regions — and no two report formats alike for the corporate financial statement.

"Different companies report different elements in different sequences," said Karen Vernon, Jewel's manager of financial and systems planning. "And yet, we must produce reports on levels of expenses, revenues [and] operating costs — and come up with balance sheets."

Jewel uses a data base management system (DBMS) to find the numbers it needs.

The firm reports more than $5 billion in annual revenues from its food markets, convenience stores and discount grocery stores. It operates Star Markets and Osco Drug Stores in the Boston area; Jewel and Eisner food stores, Osco Drug Stores and White Hen Pantry convenience stores in the Midwest; Buttrey supermarkets in the Western Mountain States; Sav-On Drugs in California; and Park Corp., its manufacturing division, in Illinois.



Financial data for monthly financial reports is keyed into the system by the operating companies. It arrives at corporate headquarters here over dial-up telephone lines and enters designated files in the firm's DBMS, Ramis II from Mathematica Products Group, Inc.

Ramis is used at Jewel in a number of areas other than financial reporting. These include:

■ Store data base maintenance. Data for each of Jewel's supermarkets and drug stores is kept up-to-date in a data base consisting of 200,000 records. This data base contains financial and other data for each store.

■ Decision support. An application has been developed to study compensation and bonus programs for a selected group of Jewel's 57,000 employees.

■ Auditing. The corporate auditing staff is the most recent addition of users to the Ramis II at the firm's headquarters. The product's report-writing facilities and Relate are used to produce a large number of reports from Vsam, Osam and other external files.

The Ramis II DBMS runs under the MVS/TSO operating system on the firm's Amdahl Corp. 5860 mainframe, which has 24M bytes of memory and 100 spindles of disk capacity in the form of IBM 3380s and Storage Technology Corp. drives.

Ramis manipulates its own stored data with the figures from the incoming operating companies' financial reports, and Relate, a Ramis II option, combines data from multiple sources. Formatted income statements for corporate accounting can be ready within minutes, Vernon said. Executives at Jewel headquarters then study and interpret the reports.

Managers analyze only one report for each operating company, but the companies need specific breakdowns of the figures to produce reports for the different regions in which they operate, Vernon said. Ramis allows the operating companies to access the data they need.

Reasons for choice

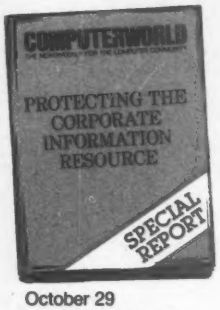
She called the ability to produce "a multitude of different formats through the same system" one of the reasons Jewel chose Ramis almost 10 years ago to handle its financial reporting. Another reason was that, she said, "We knew back in 1975 that financial reporting formats would change frequently and that a product was needed that could easily adapt with us." The adaptations, she said, had to be made without the help of outside programmers.

Jewel tested Ramis' ability to handle such changes in 1977, when the firm changed its financial reporting needs and required that all finances be reported down to the level of net earnings. The decision prompted an overhaul of all reporting formats. Jewel's accounting department made the necessary changes to approximately 30 different reports within one week without help from any programmers, Vernon said. Since the firm began using Ramis, "That sort of thing has happened a number of times."

She said Jewel has found Ramis reliable and has uncovered fewer bugs in the DBMS than in most systems the firm uses. Additionally, Mathematica has upgraded its product. "Over the years, it has become far more complex than it was when we first acquired it," Vernon said.

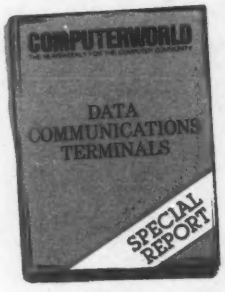
The increased complexity has allowed Jewel to take on more comprehensive tasks, she said, but it has also caused a problem: Training people to operate Ramis has become difficult. Vernon said she would like to acquaint users with the system through an introductory training manual, but added that Mathematica's manual is out of reach for new users. "The manuals are huge, they're almost overwhelming."

If you're not in *Computerworld's* next three special reports, look at the issues you'll miss



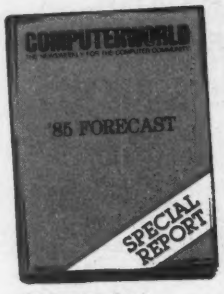
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November 26

Data Communications Terminals
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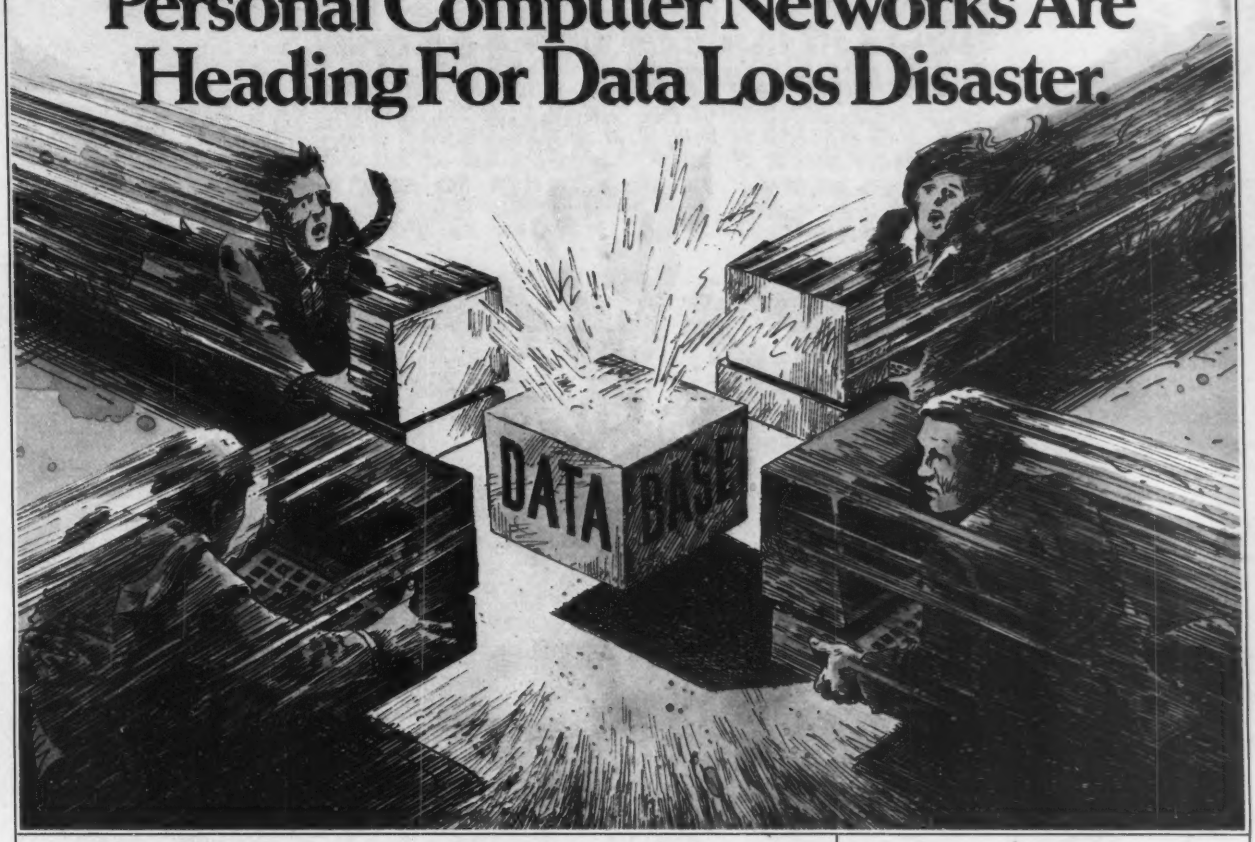
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TODAY'S VAX FAMILY: UNPRECEDENTED COMPATIBILITY FROM THE DESK TO THE DATA CENTER.

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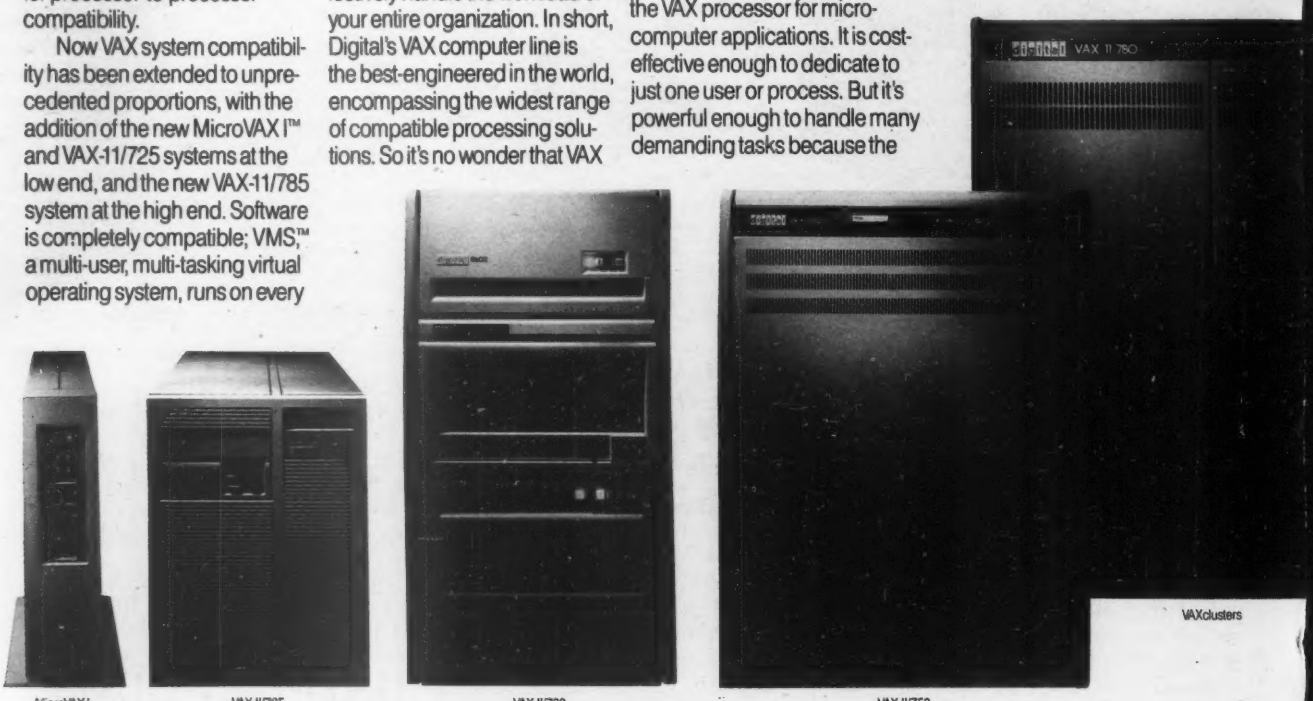
Within the VAX computer family, compatibility can range from systems that fit on a desktop and economically support a single user to systems that occupy a data center and can effectively handle the workload of your entire organization. In short, Digital's VAX computer line is the best-engineered in the world, encompassing the widest range of compatible processing solutions. So it's no wonder that VAX systems have become the most popular 32-bit computers.

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MicroVAX I VAX-II/725 VAX-II/730 VAX-II/750 VAXclusters

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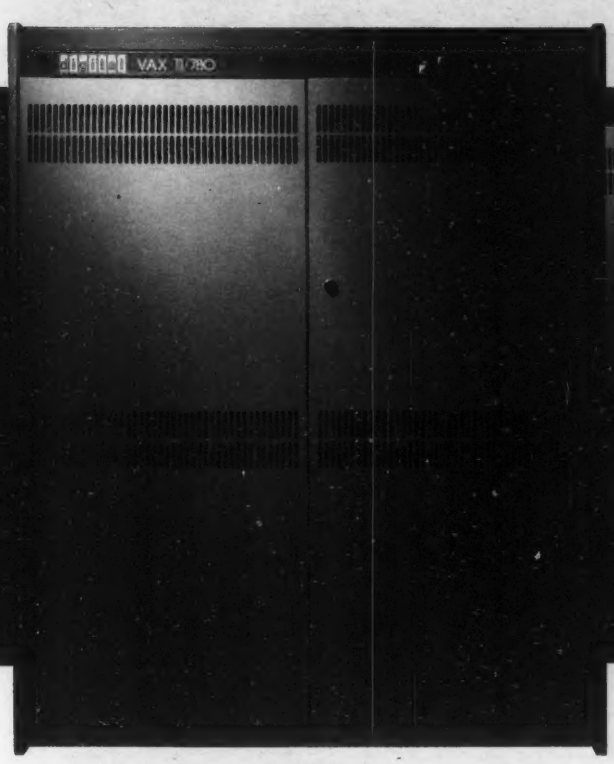
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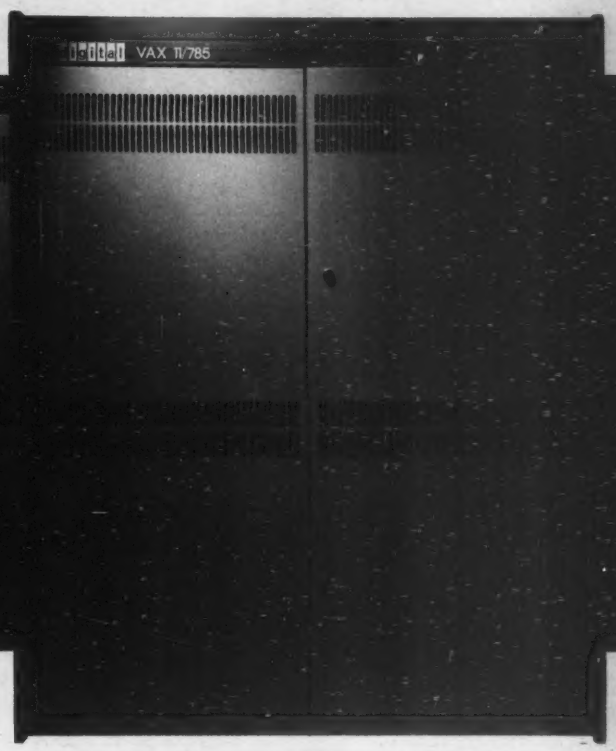
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SPECIAL **REPORT**

Fourth-generation language, DBMS ease insurance

MADISON, Wis. — For the average MIS or DP department, it often seems to take all the running the department can do just to stay in place.

In the insurance business, where data and its processing ultimately are the business, simply holding even is not enough.

American Family Mutual Insurance Co. serves personal and commercial clients in 11 Midwestern states. American Family employs over 4,000 people and has nearly 2,500 exclusive agents selling its policies. Over three million policies currently in effect account for yearly revenues of roughly $800 million.

Insurance-oriented data processing is a complex and difficult application. There are countless forms and policies, plus vast books of rates, schedules, rules, regulations and exceptions — all subject to frequent change. The companies typically handle millions of individual policies.

With all these complications, the paperwork in insurance policies is vulnerable to errors. Historically, in the insurance industry, it has not been unusual for one of every three or four policies to contain a substantial error in either data or calculations.

Reduce errors

Computers help to reduce this problem in three ways: by improved data management and processing, faster policy writing and more active participation in data calculation and verification.

Each of these steps requires new application systems, and each new system typically requires a major programming effort — enough to overload even the best DP staff.

A few years ago, American Family formed a committee within its MIS department to research the subject of development productivity. The committee's recommendation was to bring in a fourth-generation programming language and, along with it, a data base management system (DBMS).

"Basically, we had to come up with a way to deliver systems faster," summarized Wayne Burmeister, American Family's director of data resources and administrative planning.

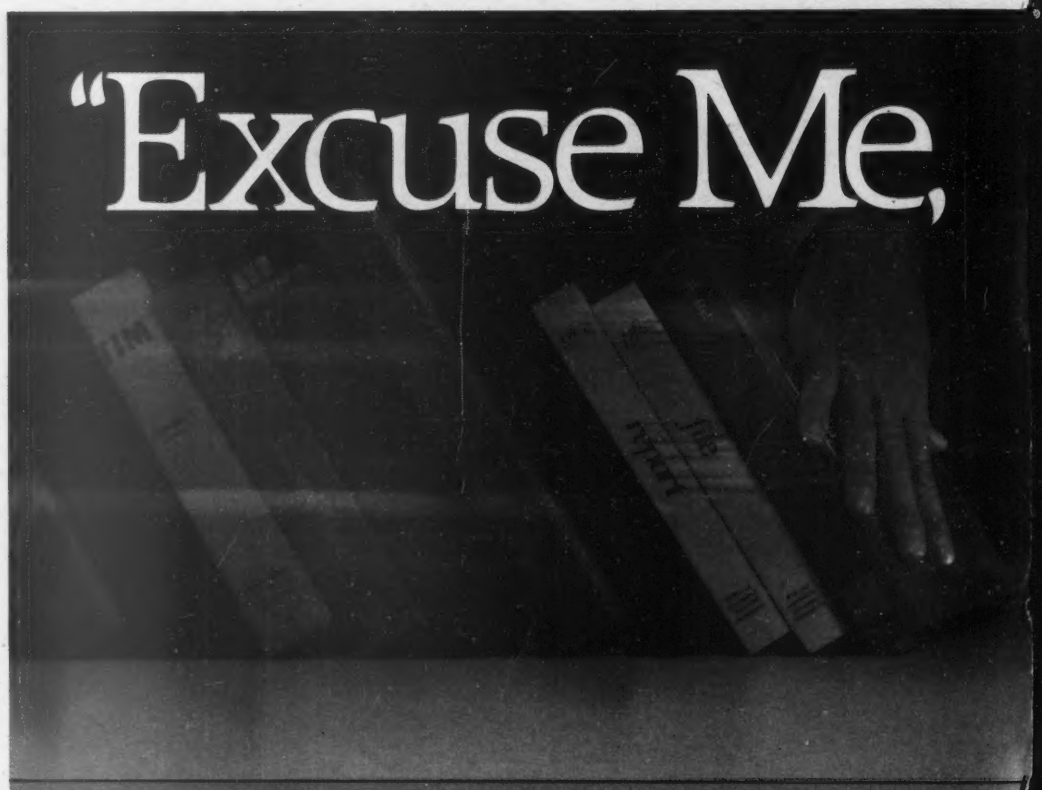
American Family took measures to cut down on application development time and maintenance requirements. After researching several available products that would run in American Family's IBM-compatible mainframe environment — two Amdahl Corp. 5860s running MVS with 16M bytes of main memory each and 30G bytes of disk capacity — American Family selected Software AG of North America, Inc.'s Natural and Adabas as its high-level programming language and DBMS. It also purchased several related products designed to enhance user access to system facilities while maintaining central control — the Predict data dictionary and the Adabas and Natural Security Systems.

After an initial installation, the products were up and ready in a couple of days in test mode. American Family's MIS department ran six pilot systems in a matter of a few months, and the first real system came up in four months after installation.

Through the use of these products, application development time was substantially cut from that required by Cobol under CICS, while maintenance, which previously consumed half of the MIS department's time, was also expected to drop dramatically. At the same time, systems that were developed with the new software tools allowed American Family employees to provide faster, more accurate and more informed service to their insurance customers, according to Burmeister

"The Software AG product line seemed to be the most flexible for the long run in several ways," Burmeister said. "One, Natural met our needs for both query-type processing and production processing. At the moment, we're still a production-ori-

"Excuse Me,



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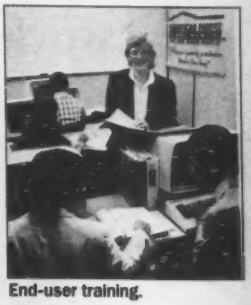
firm's application development problems

ented shop — making complete systems for our end users — but the role of direct data-base query by end users is increasing, and we wanted to be able to provide this capability when it's needed.

"A second aspect of our choice was flexibility in designing systems," Burmeister continued. "The hierarchical data base management systems we looked at did not lend themselves to this — you had to have your data structure and system design pretty well nailed down before you were too far along, or you'd have to go back to square one if you decided on any significant changes later in the design cycle. Adabas lets you make changes much more easily and with less environmental impact.

"And third," Burmeister said, "was maintenance concerns. We're going to be developing a lot of systems. We'd like maintenance to consume less of our staff time. Adabas and Natural looked like they would be able to help us meet this goal."

A year and a half after installing Natural and Adabas, Burmeister reported, eight working systems were in place, with 1,200 terminals accessing the systems, and three more were in development. "We've set up a user data base for accounts payable, being run as a query system. Systems we're working on include a health policy processing system and an employee savings/investment system. And we've put up time-and-attendance systems to track employee information, a supply inventory system, a cash collection system for our group health policies, a fleet management system, miscellaneous accounting systems and an auto underwriting system — the first phase in upgrading our auto processing system. We feel we're doing quite well."



End-user training.

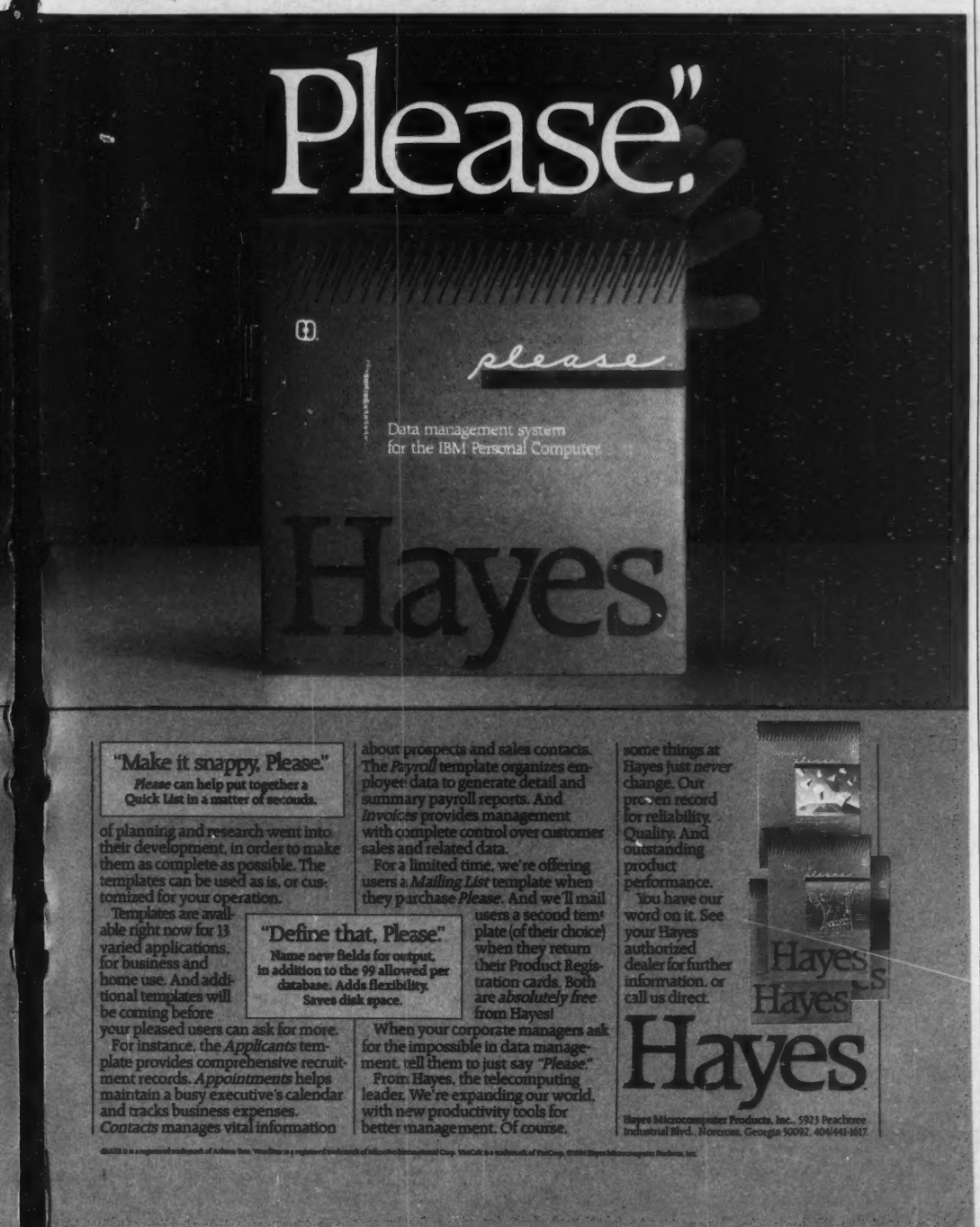
Significant breakthrough

The auto underwriting system represents a significant breakthrough in the insurance industry work cycle, Burmeister noted. "Traditionally, insurance policy processing is anything but real-time. It's very paper-oriented, and even with on-line data entry, which we already have, policies still wait to be batch processed at night, turned into paper, checked over by staff and then sent back to the underwriters in the various regional offices," he said. "We have an on-line network of 1,200 terminals throughout our offices, but getting the data into the system is only the first step in an intricate process.

"With Natural and Adabas, we're beginning to turn the policy-writing process into a real-time activity," Burmeister said. "The idea is to have all the current policy data, rate data, schedules, ranges and so on available to the computer, so the data can be checked as the operator enters it and the policy processed right then, in real time. The underwriter can review everything from the terminal without handling paper. This will take days out of the whole process, while adding more accuracy and flexibility."

The response of data processing staff to their new productivity tools has been very positive, Burmeister reported. "They say it's great. They can do things in a few Natural instructions that would take dozens of Cobol instructions."

Although American Family's original intent in moving to a data base system was not to develop a corporate data base, but to improve the productivity of its applications efforts, it is now starting to look at all its MIS systems from a corporate perspective, Burmeister said.



Network vs. relational: Fit the solution to the need

By Bill James
Special to CW‡

If you need a data base management system (DBMS), your choices are largely between a network Conference on Data System Languages (Codasyl)-compliant model and a relational model.

Both models are capable of supporting commercial and technical applications. The task is to see which model (and vendor implementation of that model) is better suited to solving your problem.

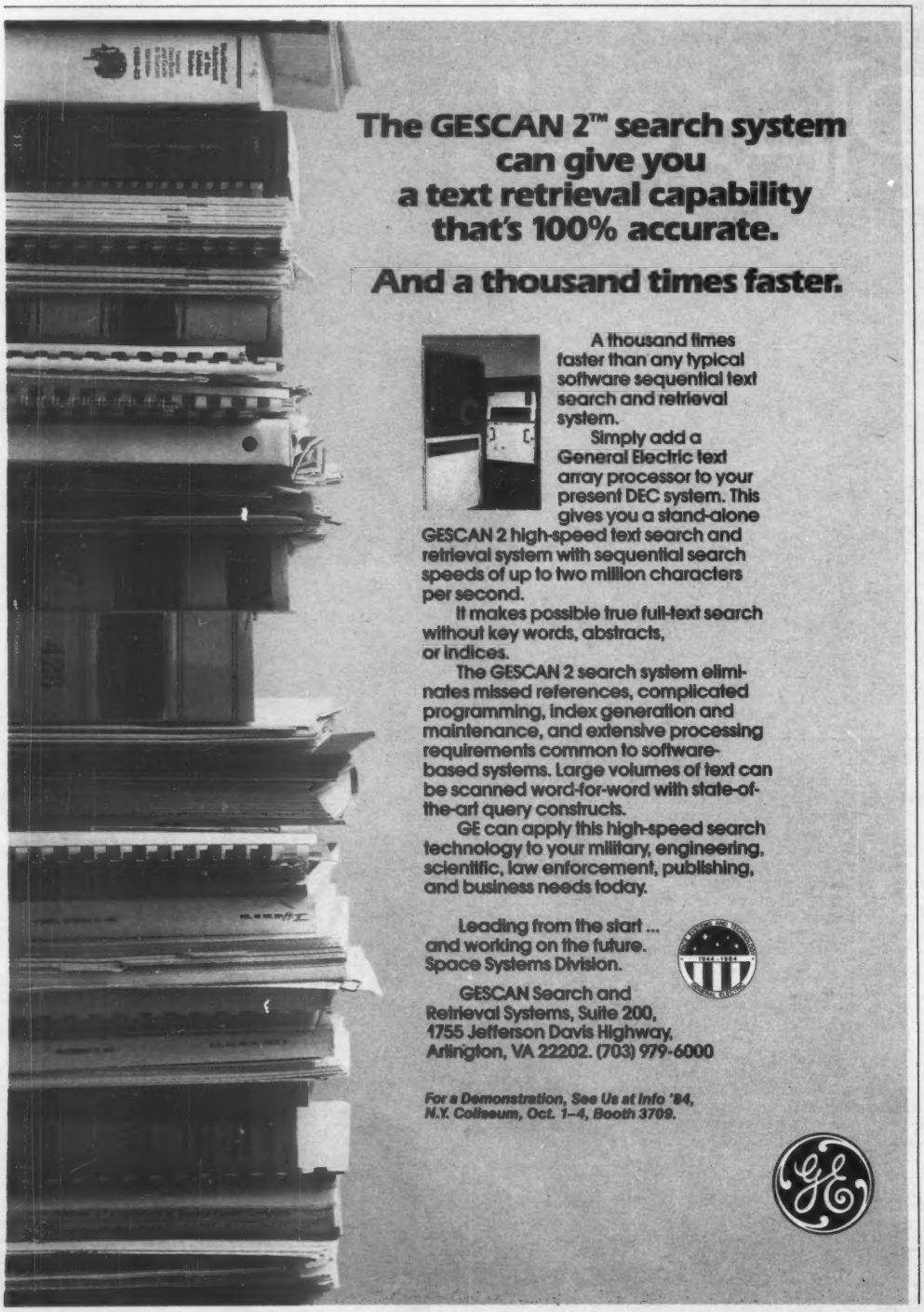
In general, consider a network model when:

■ Your application has stable record relationships. For example, inventory and order entry applications typically have predictable data entry and reporting operations that change very little over a period of years. Because the data items (and their relationships to each other) are well-known from the start, you can choose storage and access methods that give the best possible performance.

■ Experienced Codasyl data base administrators and programmers are available, and their cost is justified because their skill in application design and ability to turn the data base results in significant performance gains.

■ Your application must support large transaction volumes and instances where a significant portion of the work load is updating data. Because storage and retrieval methods can be matched to the data base application, the Codasyl model will typically handle a higher transaction rate (and have better performance on update) than an equivalent relational model.

■ Your vendor offers features that are product-specific, but nonetheless useful, for your particular situation. Some of these may be multifile data bases, performance parameters that can be tuned to specific transactions and support tools such as report writers, graphics generators and forms packages.



Relational model

In contrast to network systems, the relational model is ideally suited for situations where queries are not well-known ahead of time. Instead of designing storage and retrieval schemes into the data base logic, relational systems automatically find the best retrieval strategy for you.

In general, relational systems are better suited for applications where:

■ Ad hoc queries make up the majority of the data base activity. Typically, a query optimizer inside the relational DBMS will examine the tables and make decisions about the fastest way to find and join records. This can translate into faster retrievals than with a comparable network implementation.

■ The ease of use of the relational model is an important consideration. The tabular structure and the ability to retrieve by value ("find parts with vendor = Acme") are simple and intuitive. This allows a less experienced staff to implement a data base application and very often allows them to complete this work more quickly. This can translate into savings of time and money.

■ Restructuring will be needed as business and application needs change. Because data entities and record types are not always known from the start, the ability to redefine data and data relationships on-line becomes very important. Relational implementations offer this capability to various degrees.

■ Additional vendor-specific capabilities are useful for your particular application. Some of these might include the ability to handle unstructured data, to do remote data base query and to update and generate reports and graphics.

James is a senior product manager for relational data base systems at Digital Equipment Corp.'s software engineering facility in Nashua, N.H.

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SPECIAL **REPORT**

Data administration function at core of system success

By Mary M. Adams
Special to CW‡

A technically successful implementation of a data base management system (DBMS) does not necessarily mean that the DBMS can be regarded as successful.

A DBMS is sold as a product that supports data base functions, providing for data sharing, data independence, data accessibility and data integrity. Buyers expect to realize these advantages when they implement the DBMS, but technology alone is insufficient to achieve these benefits. It is true that some DBMS, by virtue of their facilities, even force some of the nontechnical issues to be addressed, but it is still all too easy to use the DBMS as nothing more than an expensive access method.

Although the potential advantages a DBMS offers have often not been achieved, they are nonetheless important. Companies that can obtain accurate data quickly and make timely, informed decisions will be the survivors in a highly competitive world.

The data administration function has emerged in the past few years as a critical success factor in achieving the benefits of the data base. The discipline of data administration has as its objective a cost-effective, accurate, secure and timely data resource. It is primarily one of planning and control rather than of development, implementation or maintenance:

- It deals with strategic and tactical planning time frames and establishes controls to ensure that subsequent implementation efforts are consistent with these plans.
- It creates a framework in which data bases can be shared and ensures that a data inventory is maintained.
- It includes activities such as defining the categories of data used by the business, grouping the data elements into these categories, relating the categories to business processes and specifying what information is needed to describe the data fully.

The output of this planning and analysis process is a corporate data model that forms a high-level blueprint for the implementation of physical data bases.

Most data modeling processes today are based on the normalization of data. The data model can be thought of as a set of relational data bases. A data dictionary should be used to maintain documentation on the data model, and subsequently, the physical data base environment can be mapped onto the model to complete the documentation. The documentation should reflect data security, retention and availability requirements and descriptive information.

In contrast to data administration, the data base administration function is responsible for implementation of the physical data bases. Generally, data base administrators will maintain operational data bases.

There are a number of tasks that must be accomplished in setting up the function. Probably the most important of these is establishing a charter for the group and clarifying this with the other organizational entities. The creation of a data administration function represents a major change in the way data is treated, and it is important to be sensitive to the impact of this change. Efforts must continually be spent in education and communication.

Once the responsibilities have been established, it will be necessary to select the processes, tools and techniques for the job. These include:

- Data modeling methodology.
- Graphics tools to display model.
- Revised systems development method to include modeling.
- Documentation tools.

Basic policies and standards must also be developed. Many of the early decisions will be changed and refined as experience in the function is gained.

Scope of effort

It will be necessary to decide the scope of effort for the initial project. It would be nice to address the whole corporation, developing a high-level data model that could subsequently be expanded in sections. If the company is small or relatively unautomated, this might be possible. Otherwise, it will be necessary to select a portion of the company, preferably one that is functionally independent.

Depending on the culture of the company, one possibility would be the data processing organization itself. DP data is becoming as visible to users as it is to systems management, so both parties will benefit from increased availability to the data. DP is well defined, and experience can be gained with little downside risk.

Having developed a high-level data model, a portion of it should be built, preferably on a DBMS with user access facilities, and made available to DP and user management. Then another portion should be built, continuing until the entire model is automated. If the data is not to be rebuilt, the location of the data in the current environment should be documented. The experiences from this project can be used as senior management extends data administration to the rest of the organization.

Adams is a senior systems engineer at Teradata Corp., a Los Angeles manufacturer of data base computers.

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SPECIAL **REPORT**

Users must study DBMS to select correct system type

By Hugh W. Ryan
Special to CW‡

As the information age becomes a reality, the application of data base management systems (DBMS) in maintaining and using information has become extremely popular. The enterprise that survives and is successful in the future will be the one that knows the most about its customers, its competitors and its products. These enterprises will use information to obtain a competitive advantage, and a key part of obtaining the information will be the effective use of the DBMS.

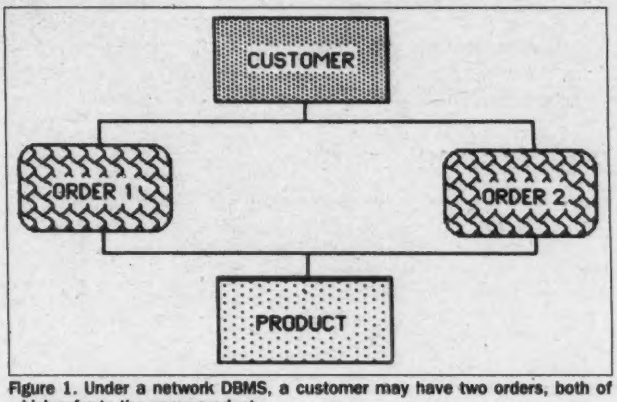


Figure 1. Under a network DBMS, a customer may have two orders, both of which refer to the same product.

Although data bases and on-line applications are not synonymous, most commercially available DBMS provide an interface to one or more on-line monitors. These interfaces provide the ability to access important data immediately, update that data and recover it, should an on-line program abort. This on-line capability means that not only can you obtain information about a customer and his order through the DBMS, but you can do so quickly. The combination of a powerful DBMS tool and a responsive on-line system provide a real tool for information for a competitive advantage.

Many DBMS are providing productivity tools as a part of their product lines. DBMS impose a certain structure on data, and various sophisticated generators can be based on this imposed structure. As productivity tools become more popular, statistics are showing that these tools can enhance programmers' production rates by a factor of two to three, particularly when packaged with tools to assist in documentation and testing.

The four major categories of DBMS are:

- Hierarchical.
- Network.
- Inverted list.
- Relational.

The hierarchical DBMS is structured so that any record in a data base has one owner. For example, an order can be identified in a hierarchical data base according to only one customer. This structure is relatively simple to understand, but it is also frequently at odds with reality. For instance, multiple customers can participate in the same order. This could not be represented by a hierarchical DBMS without modifying the principles upon which the hierarchical model is built.

Unlike hierarchical structures, the network DBMS allows a record to have multiple owners. Thus, a customer may have two orders, both of which refer to the same product (see Figure 1). Although more realistic than the hierarchical design, network data base structures have earned the reputation for occasionally creating a complex design.

The inverted-list structure approaches DBMS design from a different orientation. Unlike the hierarchical and network designs, the inverted list stores and accesses records by designating various fields of the record as keys. Since any field can be used as a key, the inverted-list design provides multiple and flexible means to reaccess a record.

The inverted-list DBMS allows a user to access a stored record — for example, a customer record — through multiple keys such as number, name, address or zip code. When multiple customers are accessed by using one of the keys — for instance, in a situation where several customers share a common zip code — these can all be presented for review and selection.

Positioned differently from its DBMS counterparts, the relational DBMS has been described as the ideal DBMS, the problem-free DBMS and the mythical DBMS. All these views have some validity.

A relational DBMS describes all information as flat records or tables, with each table including a unique key and single format. For example, in the relational model, the customer table would include customer number as a key and name and address as a part of the table.

Orders can present a problem, since an order may typically have an order header and multiple line items. In the case of orders, there must be two tables: one with the header (containing order number, due date and so on) and a second table containing line items with files such as product code and order number.

Relational model problem

Herein lies a problem with the relational model. The relational DBMS requires separating the order header and the line items because they have different formats, yet neither table by itself is of much interest. It is only when they are merged that a user can access useful information.

The relational model provides several ways to combine tables, including the projection and join functions. In the case of combining order headers and line items, a join function would be used. In this instance, software would be used to find all line items with a partial key for the order number equal to the order. With today's hardware technology, however, this can take a considerable amount of time.

Following the rules of the relational model, many small tables are formed that can be accessed in numerous ways, but many of the tables are not useful on a stand-alone basis. To circumvent this, operations exist to create temporary tables that result from pursuing relationships between records. However, with current technology, these operations can be costly in terms of data processing time.

The hierarchical and network models tend to provide access to a record, such as a customer record, by a single means, such as customer number. However, these designs also provide numerous, relatively efficient means to pursue relationships between records, such as determining all orders for a customer.

Conversely, the inverted-list and relational models provide numerous means to obtain a particular record type. For example, a customer record can be accessed based on customer number, name and address. However, where there is a need to go from one record to another, these data bases tend to have limited means to maintain such relationships, and numerous records typically must be collected. Programming is required to overcome this limitation, and such solutions are often inefficient in establishing correct and effective data relationships.

It is important in selecting the appropriate DBMS to examine each approach in practice. First, there are no commercial DBMS that are hierarchical. Information management systems have been described as hierarchical, but such models are too limited for any real-world business environment.

As a result, information management systems implement networking using the "logical relationship." Many rumors have circulated regarding logical relationships, including the fact that they do not work, they work too slowly, and they are unreliable. Many of these rumors had some validity in the early and mid-'70s, when logical relationships were new.

With time, logical relationships have stabilized; they do work as documented and are reliable. However, they also attempt to circumvent the original design objectives of a hierarchical data base, creating a system that operates in a modified mode. The result is design capability that even today lacks some conceptual clarity.

Numerous network DBMS exist, on the other hand, and they are remarkable in their ability to define data and describe data relationships. However, these models also reputedly create a difficult situation for the system designer. The network DBMS is designed so that records can easily be connected to one another. Although this seems desirable to the system designer, once these records are connected, the newly designed DBMS can take an enormous amount of time to load and run.

Network DBMS allow us to create very complex data designs with many interrelationships, but relatively few paths to access any given record. The inverted-list design solves the converse problem: many access paths to a given record. However, the inverted-list DBMS has a weak ability to form interrelationships between records.

Inverted-list DBMS useful

Where there is a one-to-one match between records, the inverted-list DBMS is quite useful. If, in the case of the customer record, a user accesses a mailing address record keyed by the customer number, then it is possible in an inverted list to move from the customer to a unique customer mailing address using the customer number (see Figure 2).

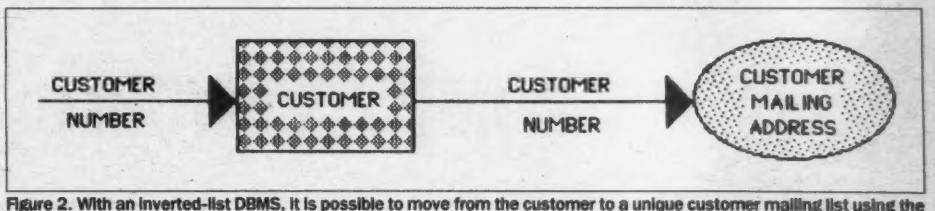


Figure 2. With an inverted-list DBMS, it is possible to move from the customer to a unique customer mailing list using the customer number.

When records are in a one-to-one relationship, inverted lists provide a straightforward means of connecting the records. When the relationship is not one-to-one, as when the customer has many orders, the problems grow more complex. If a user wants to maintain multiple relationships between records, it becomes the designer's requirement to design and implement the logic in the application. In effect, the natural structure of the data must be kept in the program rather than in the data.

To discuss the practice of relational DBMS is the most difficult and controversial. Currently, the ability to provide projection and join functions

See **STUDY** SR/43

Ryan is a partner of Arthur Andersen & Co., based in Chicago.

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is achieved by software solutions where large numbers of keys are compared. This quickly can become expensive in terms of CPU and I/O time.

To implement the relational capabilities to form relationships between records requires some fundamental advances in hardware technology. Without these advances, relational DBMS appear to be implemented based on an underlying inverted-list DBMS. This is why several rather mature inverted-list DBMS have suddenly been claimed, with some validity, to support the relational data model.

There are difficulties with implementing a relational DBMS based on an inverted-list structure. First, as with inverted lists, this implementation allows for easy access of individual record types, yet it has the same problem as inverted lists when a user wants to relate records. In theory, projections and joins should provide the means to form the relationships. However, experience demonstrates that in the case of high-volume situations, dynamic projections and joins are not practical.

The data base environment of the future will be two DBMS environments, one for the high-volume transaction environment, the other for the unstructured query ad hoc environments.

As a result, some proposals have been made to permit predefined joins. Yet this predefined "coupling" begins to imply some of the fixed, rigid data structures that relational advocates have long described as undesirable.

As relational is confronted with the problems and concerns of high volume, the need to relate records and the impact of repeated access, many of the efficiency approaches found in the current DBMS approach will become a priority to the relational structure.

There is a need in typical transaction systems for highly structured data with application programs following fixed paths with high volume while maintaining data integrity — the network DBMS. At the same time, there are sets of applications where one or two record types are of great interest and must be accessed in many ways. These requirements are well met by the current inverted-list/relational data model.

The data base environment of the future will be two DBMS environments, one for the high-volume transaction environment, the other for the unstructured query ad hoc environments. The data between these two environments will need to be shared often, with the source of the data being on the transaction side.

The existence of the two DBMS suggests a future architecture. A new component in this future architecture is the data delivery system (see Figure 3). This system navigates through the transaction data base, collecting and organizing data and then storing it in the end-user data base system. While these systems have existed for some time, their role in this future data base architecture should not be underestimated. The system's ability to extract and load data and to summarize and translate data will be crucial to the success of the future dual-DBMS approach.

Both network and inverted-list relational DBMSs are working toward different design objectives — performance vs. ease of ad hoc use. While both objectives are understandable, they are also irreconcilable, given today's hardware/software technological limitations. As a result, we can expect the two data base concepts to remain an important part of the present as well as the future.

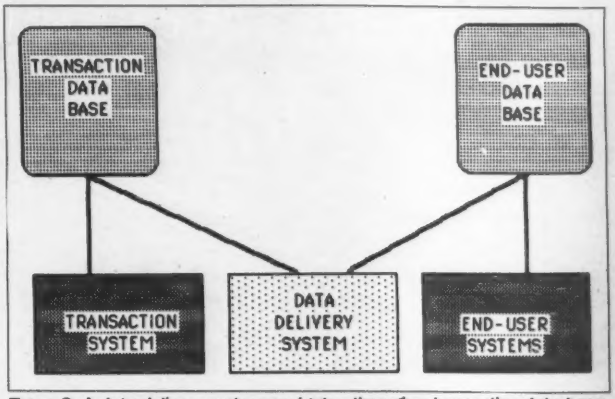
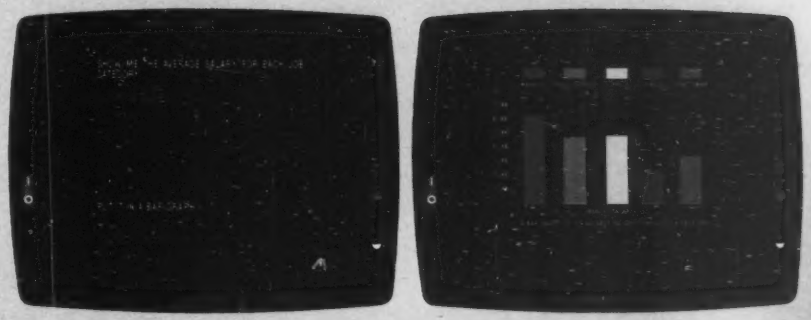


Figure 3. A data delivery system navigates through a transaction data base, collecting and organizing data, then stores data in an end-user system.

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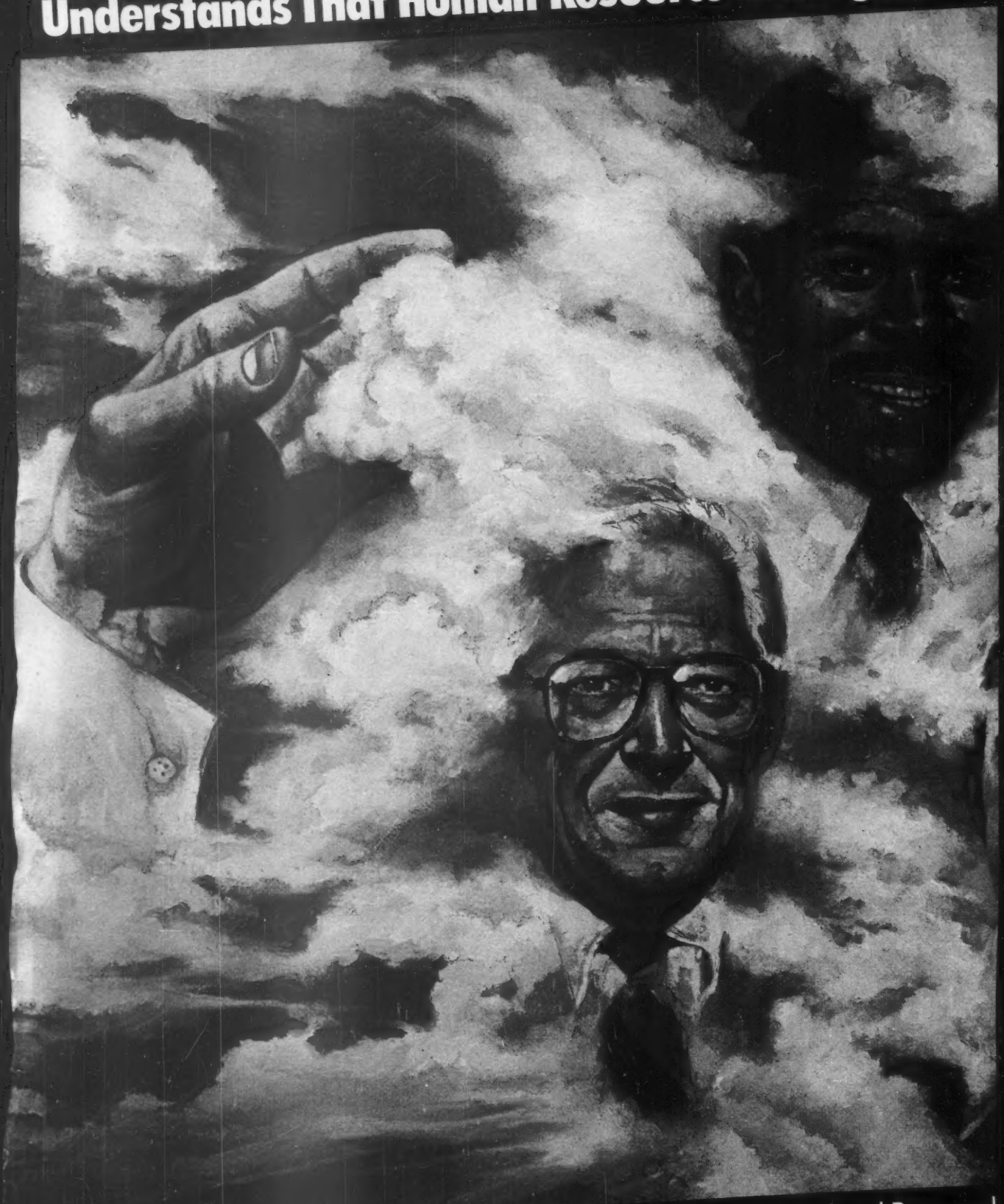
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SPECIAL **REPORT**

The art of choosing a DBMS: The informed firm's guide

By Scott T. Smith
Special to CW‡

If you were given the task of choosing a data base management system, would you know where to start?

There are four steps involved in choosing a DBMS:

- Determine and admit your constraints.
- Analyze your uses of data and your volumes.
- Understand the types of DBMS that fit within your constraints and that are capable of satisfying your requirements.
- Make the final choice, based on a combination of functionality, costs and gut feeling.

Before looking at any DBMS, determine if you have any limiting factors.

Constraints generally fall into one of three categories:

- Hardware.
- Personnel.
- Budget.

For each of these categories, separate consideration should be given to the difference between the initial investment and the ongoing investment. For the larger DBMS, you can be sure that the ongoing investment will quickly exceed the initial investments of hardware, people and software.

What are your personnel constraints? Can you afford to hire additional people to support your data base environment? This may be necessary for some large, high-volume production DBMS. How much training can you afford for your programmers and end users? A significant amount of training may be necessary if you plan to use some of the DBMS that come with a procedural language.

If you opt for a fourth-generation, user-friendly type of DBMS and you plan to turn it over to the users, try it first before you buy it to see just how user-friendly it is. And then budget for the appropriate amount of training and programmer support.

Besides the hardware budget and the personnel budget, there are the software budget and other expenses. Here more than ever, the money you spend to acquire the DBMS software is likely to be the tip of the iceberg.

Determine requirements

Once you have outlined your limitations, determine what your requirements are, based upon your data and processing needs.

A data model is a standardized way of graphically representing the data used or generated by a business or other organization. Using a good modeling technique, you can document the types of data that your company uses, the volumes, their relationship to other data and the planned usages.

It is likely that, at the completion of a comprehensive modeling exercise, it will be obvious to the trained eye what general type of DBMS will be best suited to your set of data and functions.

DBMS usually fall into one of four categories:

- High-performance, network and hierarchical DBMS.
- Inverted list, pseudorelational DBMS.
- Relational DBMS.
- User-friendly, fourth-generation DBMS.

You should then be ready to evaluate some of the DBMS that you have seen thus far. Some common things to look for are:

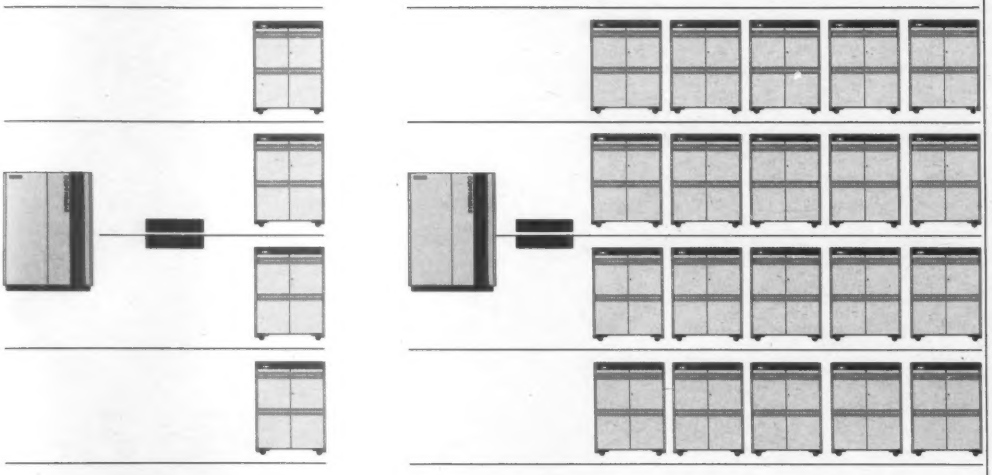
- Concurrent access.
- Data integrity.
- Languages.
- Data dictionary.
- Volume.
- Indexing.

If a given product seems to contain the functionality you require, evaluate the vendor.

After all of the facts are gathered, you will be lucky if the choice is an obvious one. The chances are that you will have narrowed your DBMS choices, each with its various pros and cons. Now you will have to look at the functionality of each, the cost of each and then go with gut feeling.

Smith is a staff consultant with Computer Partners, Inc., a Wellesley, Mass., firm consulting in the area of mainframe data base management systems.

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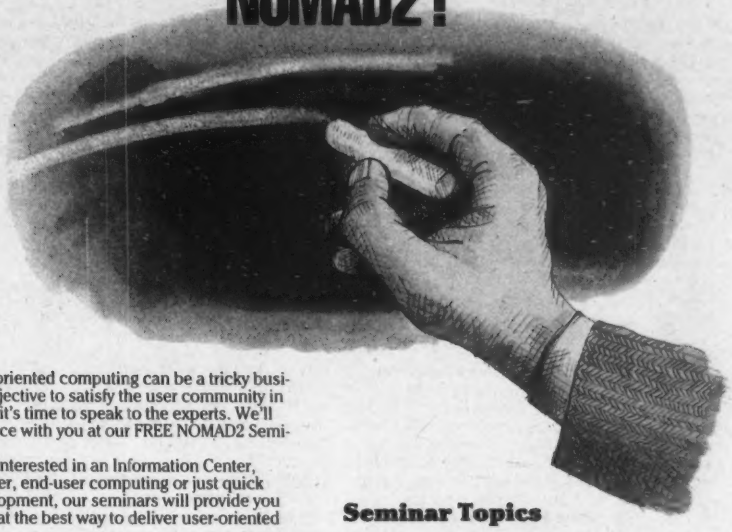
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SPECIAL **REPORT**

Data base integrates circuit board maker's design tools

KANATA, Ont. — Thanks to the recent proliferation of inexpensive computer-aided design and manufacturing (CAD/CAM) terminals, a Canadian telecommunications firm here had to put together a data base that could communicate with a variety of workstations and related software products in use in-house.

Printed-circuit board designers at Mitel Corp. use IBM Personal Computers and Daisy Data Terminal Corp. Logician terminals, among others, to design and test circuit boards.

Mitel's CAD/CAM tools include:

- GDS1 from Calma Corp., which transforms manual circuit board designs into digital information.
- Fault Finders from Fairchild Camera & Instrument Corp., which tests board designs.
- Scicards from Scientific Calculations, Inc., which takes logical descriptions of circuit boards and components and uses them to construct a physical layout of an actual board.

Mitel also utilizes Ashton-Tate's Dbase II for administrative chores such as trends analysis.

The firm needed to find some kind of commonality between the formats of these systems, according to Mike Dohler, director of CAD/CAM at Mitel.

Initial requirements called for a relational data base management system (DBMS) that would coexist with CAD software on a 6.5M-byte VAX-11/780 in the VAX/VMS environment at the Mitel research and development center here, Dohler said.

After an evaluation of a variety of relational data bases, Mitel chose the Ingres relational DBMS from Relational Technology, Inc.

At the core of Mitel's Ingres application is a computer-integrated design and manufacturing system now undergoing system integration and testing. In its current implementation, the computer-integrated design and manufacturing system integrates schematic entry devices, printed-circuit board layout tools, commercial testers and numerically controlled manufacturing systems.

Mitel is working to transfer to Ingres an ad hoc program that converts GDS1 formatted data into a form that can be understood by Fault Finders, thus eliminating duplication of information between the design and test stages. This application, along with report writers and software interfaces to CAM tools, should be completed by February 1985, Dohler indicated. Together, the integration of the tools should save Mitel between $500,000 and $1 million annually.

Another application, currently in beta testing, allows information from the Daisy workstations to be used by Scicards. Dohler said that this application, set to be finished at the end of this month, should save Mitel about four man-years of effort every year.

The Daisy-Scicards application development pinpointed the only problem Mitel has found with Ingres to date. In its initial form, the application took about 90 minutes to run because of inefficient programming.

Dohler noted that this inefficiency was not a fault of the product itself, but of users' attitudes toward it. Because Ingres allows programs to be thrown together quickly, he explained, programmers sometimes develop applications without first thinking them through.

He called the experience with the Daisy-Scicards application "part of the process of learning to use Ingres." The firm has since rewritten the application, and it now runs in under 10 minutes.

Conversions from inefficient programs to efficient ones, he said, are relatively easy to make. Programmers sit down with users, figure out proper procedures and correct problems.

The process supplements the firm's user training program. At Mitel, users are given an introduction to Ingres and sent on their way, Dohler said. "People are free to use [Ingres] if they wish and free to take advice." When advice falls on deaf ears, programmers review bad applications and offer more advice.

Dohler said that, at Mitel, the use of stand-alone CAD tools has proved cost-effective, "even though a considerable amount of support must be provided [to users] to get the greatest benefit."

"Integration of the various CAD and CAM tools is not only feasible," he said, "but also provides a payback that is double the payback of the isolated systems and far in excess of the cost of integration."

Dohler said the use of a relational DBMS simplifies the effort required to integrate CAD/CAM tools and provides flexibility for enhancing the system and adapting to new technology.

According to Emran Qureshi, a CAD data base engineer at Mitel, Ingres has specific features, related to performance, that make it stand out from other relational DBMS.

For Mitel, he said, Ingres' most important features are:

- Quel, which offers the ability to optimize and compile queries.
- Equel, which provides data management through embedded queries in a high-level programming language such as C or Pascal.

"The use of Quel, a nonprocedural query language, greatly simplifies data access by software designers and ad hoc users," Qureshi said.

Improved performance

"Performance, traditionally a problem with relational data bases, is improved by the Ingres query optimizer, which generates an optimal query execution plan for each query. This minimizes the amount of disk I/O and CPU resources consumed," he said. "Additional performance improvements can be obtained by compiling queries, thus reducing the overhead of queries at runtime."

Mitel maintains four licenses of Ingres, one supported and three others unsupported, in three locations in Canada and England. It is now using Ingres Version 2.1, but is waiting for the recently announced Version 3.0.

"We can make good use of some of the improvements in the user interface we have heard about," Qureshi said.

Version 3.0 users can update or browse through data from more than one table and multiple rows from a single table through a simple default form, rather than through the formation of a custom form, according to Relational Technology.

The upgrade is also designed to allow more qualifications in data retrieval than was previously possible.

Ultimately, Mitel expects to use Ingres for CAD/CAM on its entire range of products, Dohler said. System integration through Ingres will tie together the various stand-alone workstations the firm uses in its CAD/CAM efforts.

"Because the price/performance ratio of new CAD systems is dropping so rapidly, flexibility, or device independence, is essential to improving the productivity of any modern design and manufacturing concern," he said, adding, "If we hadn't had Ingres, we probably would not have attempted this project."

Trans-Atlantic program transfer

CALDICOT, Wales — Like its world headquarters in Canada, Mitel Corp.'s European headquarters here uses Relational Technology, Inc.'s Ingres, Scientific Calculations, Inc.'s Scicards and Daisy Data Terminal Corp.'s Logician workstations.

Mitel's Canadian computer-aided design and manufacturing (CAD/CAM) group plans to offer its counterpart here the Daisy-Scicards application that it has developed in Canada, according to Mike Dohler, director of CAD/CAM.

Similarly, the Welsh group will offer the Canadians a system called Engplan that it has developed for planning and tracking engineering design projects with Ingres.

Engplan keeps a record of jobs in progress, variables affecting those jobs and target dates for completion used to forecast and track historical performance, noted Dave Knox, Mitel's engineering computer services manager. Critical path and scheduling calculations are also performed.

Dohler said Knox will visit Canada this fall to discuss Engplan and determine whether home headquarters will use it for CAD/CAM work.

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SOFTWARE & SERVICES

IBM ISFP dialog manager: More than meets the eye

By Jan Kostyun
Special to CW‡

The majority of recent IBM mainframe users are familiar with IBM's Interactive System Productivity Facility (ISFP). ISPF is characterized by a system of screens or panels that directs its users to the execution of a variety of powerful foreground utilities, all executing under control of IBM's TSO. These functions make ISPF a powerful program development aid.

Kostyun is a data base analyst with Exxon USA in Houston.

At the heart of ISPF's productivity facilities is dialog management services. The dialog manager is the system management function that makes ISPF work. It provides the screen-handling capabilities and linkage to programs behind the screens that allow for all the foreground activity. But the dialog manager also provides a user interface that allows for the definition of new foreground applications.

These applications can work just like the standard ISPF Program Development Facility (PDF) — that is, foreground screens with supporting programs, pro-

See DIALOG page 86

SOFTLINE
Kathy Stanford

Train, document before celebrating

When should you celebrate the completion of your new application system — at implementation or after the end user receives the full benefit of the system? The answer is obvious, but it leads to a very important question: Why doesn't the successful implementation of a system always lead to its successful use?

The benefits your company receives from your new application system may be jeopardized if the users are not properly trained or do not have adequate documentation to use the system.

See INSTRUCT page 83

Stanford is president of K.L. Stanford, Inc., a Century City, Calif.-based consulting firm. She has more than 12 years of experience in data processing.

Entry-level, advance function Omnilink debuts

CHICAGO — Building on its Omnilink software package introduced last year, On-Line Software International, Inc. offered IBM mainframe and Personal Computer users both an entry-level and an advanced function version of that microcomputer-to-mainframe link at the fifth annual Software/Expo conference held here recently.

According to a spokesman for the company, Omnilink Entry-Level is designed to give users an opportunity to evaluate microcomputer-to-mainframe link technology while at the same time providing an upgrade path to the company's Omnilink Advanced-Function.

The Omnilink Entry-Level package, according to the vendor spokesman, allows users to select interactively all or portions of standard flat files — IBM's Vsam, Bdam and Isam — and it features full downloading and uploading capabilities and a data dictionary. In addition, the package is said to include On-Line's Executrieve/PC English-syntax query facility, file transfer capabilities and a reformatting facili-

See EXPO page 70

SOFTALK
John Gallant
CW Staff

DP preparation: The missing link?

Earlier in this space [CW, July 30], DP managers were urged to muster all their critical and analytical capabilities in planning for the dawning of the microcomputer-mainframe link environment. Now, in light of Input, Inc.'s recently released study "End User Micro-Mainframe Needs," it seems a little reiteration is in order.

Input, a market research firm headquartered in Mountain View, Calif., didn't mince words in predicting the scope of the technological and organizational changes that the linkage of micros and mainframes will foster in the very near future. The company predicts that DP will undergo alterations as revolutionary as those brought about by the introduction of IBM's System/360, which restructured the narrowly focused roles and responsibilities of that department in the 1960s.

Thomas O'Flaherty, principal consultant with Input, neatly summed up the implications of micro-mainframe linkage in a recent interview with *Computerworld*. The next decade, he said, will be one marked by rapid change — change that DP has not always handled with aplomb.

"The linking of micros and mainframes may create a very unsettling period for DP professionals in the years to come," O'Flaherty said. "It will certainly make things more interesting. Nothing up until a year or two ago [had] changed very much in the MIS world. Systems [had] gotten a little faster and a little smarter, but nothing really [had] changed. This [linking] will make a big difference. If you like change, that will be fine. If you don't, you won't like the years to come."

One can only hope that DP managers

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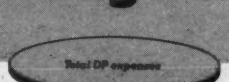
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SOFTWARE & SERVICES

Uccel releases UCC-4 inventory accounting system

CHICAGO — Uccel Corp. recently unveiled its UCC-4 Hardware Accounting System, an inventory accounting tool designed to aid in managing data centers.

Announced at the fifth annual Software/Expo conference here, a spokesman for the company said UCC-4 is a double-feature inventory accounting software system for IBM mainframes under IBM's MVS with CICS.

The spokesman said UCC-4 offers a centralized data base for equipment inventory control data and on-line access to information used for tracking and controlling hardware costs.

The system's hardware accounting functions reportedly aid in the management of all purchased, rented or leased equipment.

Inventory control functions include configuration impact analysis, tracking of on-order equipment, rental and lease accrual tracking and current book value tracking, the spokesman said.

Billing verification reports compare anticipated vendor charges with those received on vendor invoices, and the package's financial information can also be used for internal cost distribution and budget projections, according to the company spokesman.

Interface benefits

The spokesman said that a direct interface between UCC-4 and the company's UCC-8 Data Center Management Software will provide for the management of all equipment problems. The interface will allow users to maintain a record of device failures, vendor responses and their impact on configuration.

Physical inventory information maintained under UCC-4 includes equipment identification, location, vendor, model and serial number, attached features, price, depreciation and maintenance schedules.

Each piece of equipment in on-hand inventory, the spokesman said, is uniquely identified with a specific location and can have up to 50 optional features. The system can track both hardware and software inventory.

UCC-4's Cost Distribution function automates calculations needed to spread all monthly equipment charges to user-defined accounts, departments and cost centers.

A cost distribution report can be generated as a future month's projection, providing a budgeting tool for DP equipment charges.

The spokesman said UCC-4 is scheduled for shipment in November and will be priced at $15,000.

More information is available from Uccel, Uccel Tower, Exchange Park, Dallas, Texas 75235.



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ty for using downloaded data with micro applications, including Lotus Development Corp.'s 1-2-3, Visicorp's Visi Calc and Ashton-Tate's Dbase II. An optional feature — dubbed Aura — adds an application generator and graphics, spreadsheet and word processing capabilities tied together under a data base management system.

With the Entry-Level package users reportedly can log on to the mainframe, interactively select data from mainframe files using English-syntax and download data with automatic reformatting for manipulation and uploading to the mainframe. The system also provides data security, as all information requests go through Omnilink's data dictionary.

The spokesman said Omnilink Advanced-Function builds upon the functions offered in Omnilink Entry-Level. The Advanced-Function package gives the user access to multiple files and, using English syntax, allows the user to select, extract and combine data from those files for downloading to the Personal Computer. The package also incorporates electronic mail technology to allow micro-to-micro communications.

After downloading and manipulating selected data from one or multiple files, the micro user can send any file to another micro in a network. With the Advanced-Function package's Transparent Transfer option, users reportedly can take any micro file containing data, text, graphics or programs and route it to one or more micros in the network.

Omnilink Advanced-Function also features On-Line's Content Access Method technology, which allows end users to access, manipulate and update data selectively regardless of how the data is organized and physically stored. It also provides access based on data content rather than structure. As with Entry-Level, Advanced-Function includes Executrieve/PC and automatic reformatting facilities for micro applications.

Omnilink Entry-Level is priced at $10,000 for the IBM DOS version and $15,000 for the IBM OS version. Omnilink Advanced-Function is priced at $20,000 for DOS and $30,000 for OS. IBM Personal Computer copies of Omnilink are priced between $300 and $800, depending on the quantity purchased.

On-Line Software International is located at Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.



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Master Software offers on-line Programaster version

WATERTOWN, Mass. — Master Software, Inc. has added on-line capabilities to Programaster, its application development system that employs reusable code techniques.

The on-line product runs on IBM mainframes under IBM's MVS operating system with IBM's TSO and generates programs that run under IBM's IMS data base management system.

The new product, called Programaster/OL, is integrated with Programaster/BP, which is used for batch processing. The on-line version employs prototyping, management and screen- and report-painting features that can be used in both batch and on-line modes.

Master Software's reusable technology is said to support automation of the entire development process from design to implementation. In typical cases, users need to write only 15% of the code necessary to produce an application, a spokesman said. Programaster/OL generates complete and logically consistent on-line applications in Cobol 68 or Cobol 74.

The spokesman said that as the Programaster system is used, the amount of standard code increases, resulting in a reduction of program coding over the life cycle of the product.

The prototyping feature reportedly allows the user to develop the logical processing flow of screens and programs before implementing the system. The systems management capability monitors and controls the user's reusable software library, keeping track of its usage and any changes made to it.

The screen- and report-painting facility allows the user to create screen and report formats on-line, the spokesman said. Programaster then develops the statements required to compile the screen and reports.

Programaster/OL and Programaster/BP are available individually on an annual license of $5,000 per installation plus $2,500/mo. A perpetual license for either product costs $95,000.

An integrated system consisting of both batch and on-line systems is priced at $7,500 per installation plus $3,000/mo or $145,000 for a perpetual license. Training is included.

Master Software is located at 42 Pleasant St., Watertown, Mass. 02172.

SYSTEMS SOFTWARE

SOFTOUCH SYSTEMS
CICS-Juggler

Softouch Systems has announced enhancement of its CICS-Juggler, a software utility that reportedly allows any IBM 3270 series terminal running under IBM'S CICS to be defined as up to nine logical terminals, each capable of an on-line CICS task.

CICS-Juggler reportedly now offers a windowing feature that allows up to four windows to be displayed at once.

Among its windowing formats are the ability to display two horizontal or two vertical windows at the same time. Windows can be panned up, sideways or down.

CICS-Juggler also reportedly reduces the need for constant logging on and off of an application or continually moving in and out of menu selection screens. Users can also move from one logical terminal to another by pressing a single user-defined key.

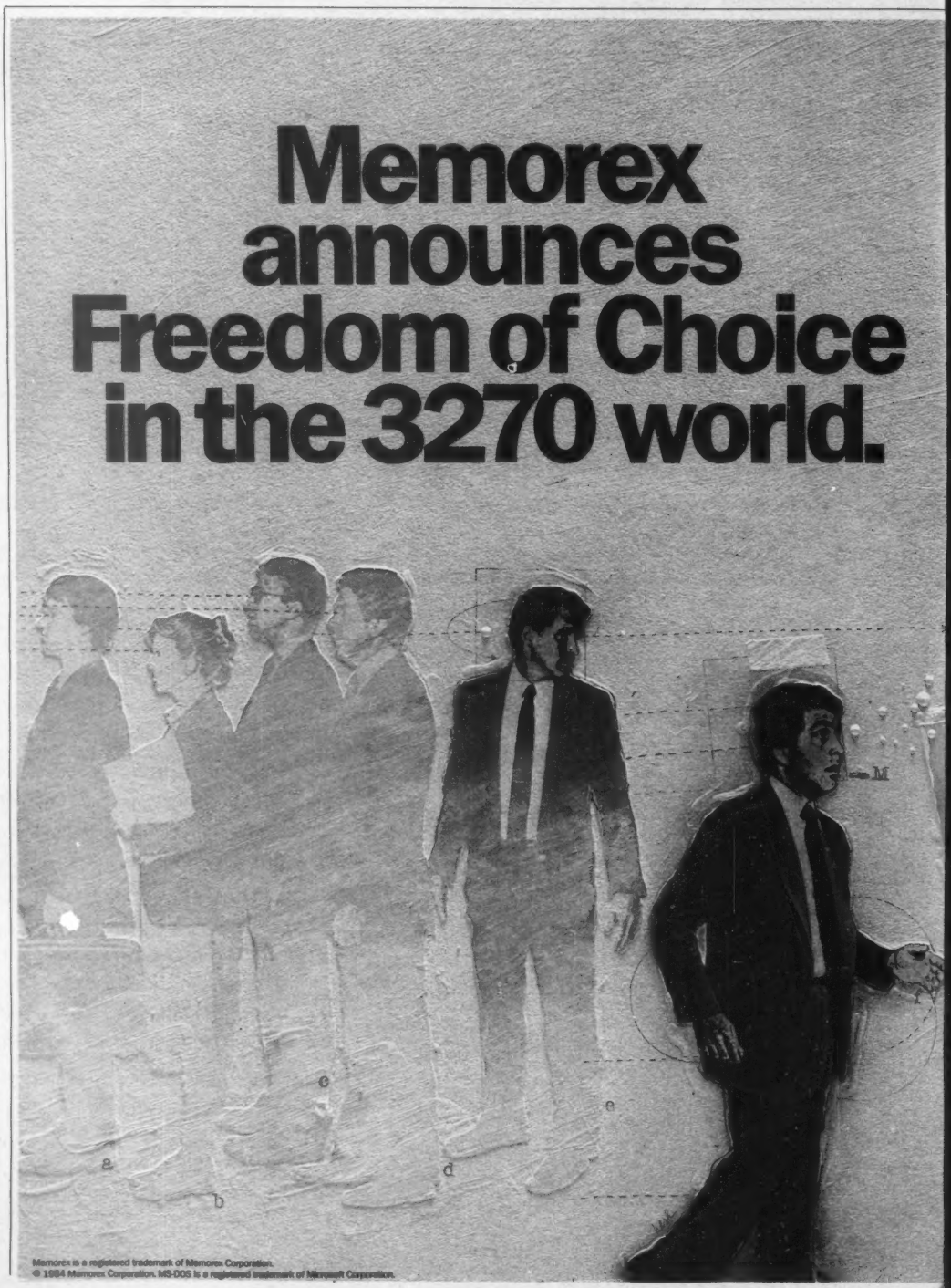
No additional hardware or ports are needed to run CICS-Juggler, and only one link-edit and two CICS table entries are required for installation, according to the vendor.

CICS-Juggler is priced at $2,500 in its DOS version and at $3,500 for OS-based systems.

Annual maintenance fees are $300 and $500 for DOS and OS, respectively.

Softouch Systems, 8265 S. Walker Ave., Oklahoma City, Okla. 73139.

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SOFTWARE & SERVICES

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TONE SOFTWARE CORP.
TS-Print Release 2.3

A network test facility, message logging and audit trail and a print replacement are among the enhancements recently announced by Tone Software Corp. in Release 2.3 of TS-Print.

TS-Print is a JES external writer that reportedly allows users to print data from the JES spool queue to almost any Ebcdic or Ascii printer supported by IBM's Btam or Vtam under IBM's OS/VS1, OS/MVS and OS/MVS/XA.

The new version also supports the Xerox 2700 printer line, the company said. Permanent license for the TS-Print is $9,500.

A one-year license is $400 per month, according to the vendor.

Tone Software, 1735 S. Brookhurst St., Anaheim, Calif. 92804.

INFORMATION BUILDERS, INC.
Focus-Intellect interface

Information Builders, Inc. has announced an interface between its Focus nonprocedural, fourth-generation language and data base management system and Artificial Intelligence Corp.'s Intellect natural language query system programs. Both products run on IBM mainframes under IBM's VM/CMS or MVS/TSO.

The interface comes in two parts: Focus-Intellect from Information Builders and Intellect-Focus from Artificial Intelligence. Focus-Intellect allows users of both products to access Focus data bases by entering the Intellect mode of the Focus Report Writer. This mode makes the full set of Intellect's facilities available.

Focus-Intellect is available as an added-cost option to Focus for $5,500 for a perpetual license or $175 per month. The Intellect-Focus portion is available from Artificial Intelligence of Waltham, Mass., for $15,000.

Information Builders, 1250 Broadway, New York, N.Y. 10001.

PRODUCTIVITY AIDS

EASYSPEC, INC.
Easyspec

Easyspec, Inc. has announced a two-part productivity tool that automates the definition of users' requirements and designs the relational data base structure in the third normal form-relational data base design concept. Easyspec runs on Digital Equipment Corp. VAX-11 computers. It is compatible with any relational data base system, the vendor said.

The Easyspec User Requirements Definition part standardizes the definition of users' requirements, creates and maintains the requirements data base, generates requirements reports and analyzes data base elements requirements for completeness and correctness, a spokesman said.

The relational data base designer component designs and normalizes the relational data base structure in third normal form, interfaces with users' relational data base system, maintains the tables structures and generates graph and tables structure reports, the vendor claimed.

Easyspec is priced from $2,000 to $8,000, depending upon computer model and license type.

Easyspec, Suite 202, 17629 El Camino Real, Houston, Texas 77058.

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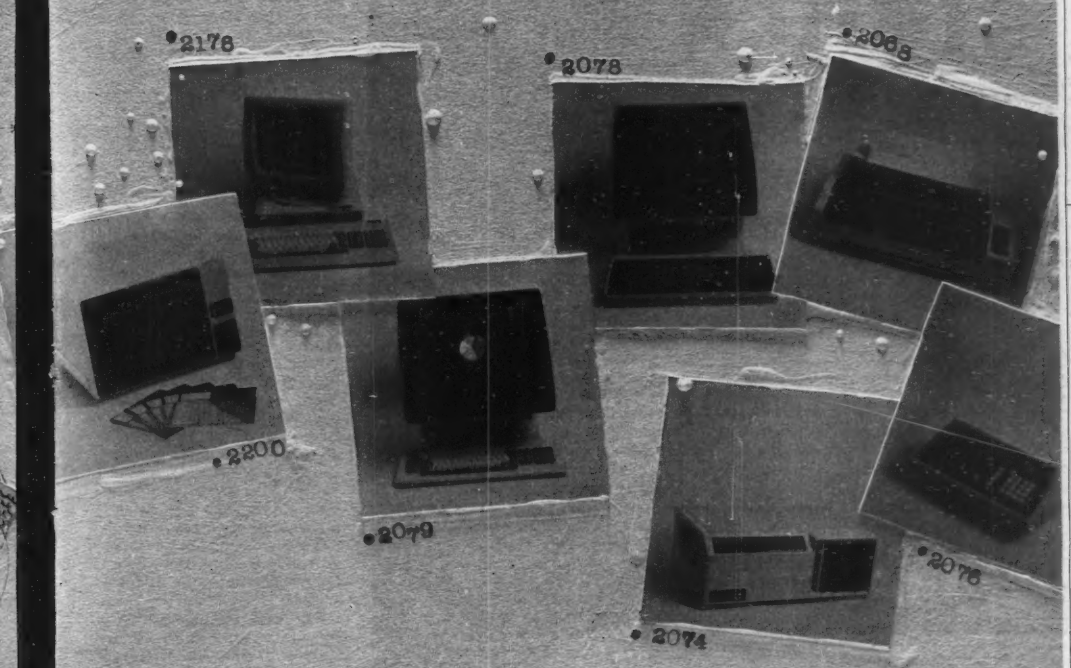
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SOFTWARE & SERVICES

APPLICATION PACKAGES

CENTURION COMPUTER CORP.
Tracs

Centurion Computer Corp. has announced an office automation system designed for wholesale and retail distributors using the company's Centurion 6000 and 7000 series minicomputers.

According to a spokesman, the Total Reporting and Control System (Tracs) is an integrated package that automates purchasing, inventory management, costing, pricing and accounting. It is also designed to provide analysis capabilities and business performance reports.

The package is said to maintain a detailed sales history by item, including information on date of sale, invoice, customer, quantity, unit price, cost and profit. Inventory can be accessed through multiple "quick search" methods, and the system maintains item files that assist users in finding, selecting and pricing the right materials for a particular job.

Tracs also produces inventory management reports and physical inventory reports. Stock status is tracked so that suggested stock-level reports can be generated to reflect sales history, order frequency, lead time and desired turnover rate.

The system's accounts receivable segment reportedly incorporates a list of transaction features to help control credit, track customer payments, provide special terms to specified customers and accommodate different tax codes. Tracs also includes a complete general ledger system.

Tracs is priced between $20,000 and $50,000.

Centurion Computer, 1111 S. Sherman, Richardson, Texas 75081.

EASY SYSTEM PRODUCTS, INC.
Product interfaces

Easy System Products, Inc. (Espi) has announced that its NCR Corp. VRX operating system-based on-line software systems have been interfaced to two other product lines.

According to a spokesman, six Espi products have been interfaced with Consolidated Software Systems, Inc.'s Virtual/On-Line Transaction Distributor System (V/OLTDS) and Integrated Design Engineering, Inc.'s Port-Saver.

The Espi products include Espi Fixed Asset System, for the management of depreciable and nondepreciable fixed assets; Espitape automatic magnetic tape system; Espiview full-page text editor and source librarian; Espicalc mainframe spreadsheet; Espiopt operations performance tool; as well as Espiminder electronic mail system.

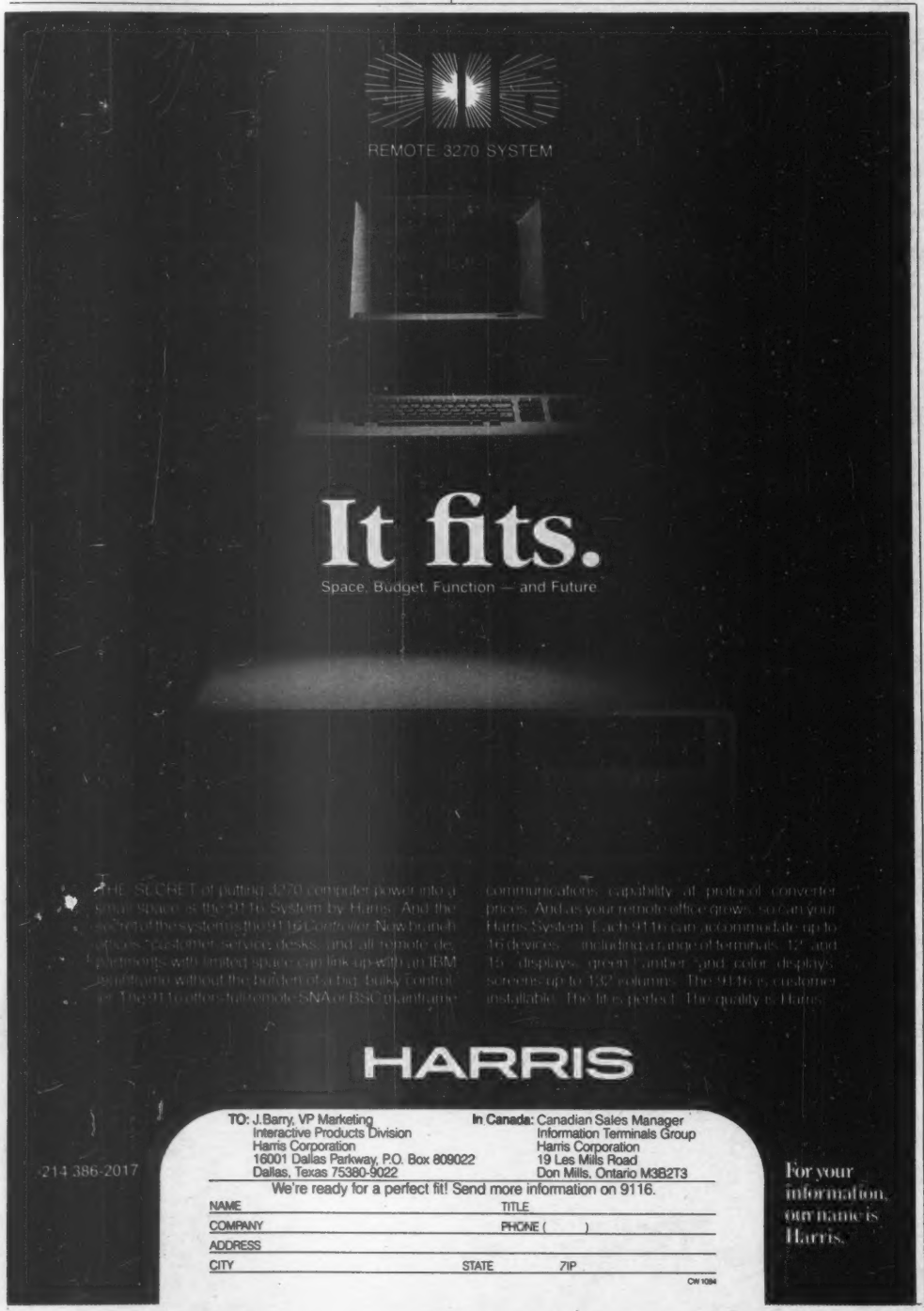
The product interfaces allow V/OLTDS and Port-Saver users to incorporate Espi packages without altering their present environments, according to the vendor spokesman.

V/OLTDS is a communications driver, and Port-Saver allows a user to connect up to 32 terminals into one adapter or NCR Communications Line Controller/Multi-Line Adapter port.

The Espi packages are designed to work with NCR 8500 and 8600 mainframes under VRX, the vendor spokesman said.

The Espi packages, including the interfaces to V/OLTDS and Port-Saver, are priced between $2,500 and $12,000, according to the vendor.

Espi, P.O. Box 191, Virden, Ill. 62690.



SOFTWARE & SERVICES

DANFORD CORP. CADRE TECHNOLOGIES, INC.
Danford Presentation Design System

Danford Corp. has announced the Danford Presentation Design System, a proprietary package that can be used to create two-dimensional monochrome presentations with both art and type on Apollo Computer, Inc. DN series processors.

Danford will market, enhance and support the graphic editing system, which was developed by Cadre Technologies, Inc. Using either a mouse or a touch pad, the Danford Presentation Design System allows a user to create images from low-level graphics objects such as lines, circles, triangles, polylines and fills. Scaling and "rubberbanding" are also supported by the package.

The system is said to include 12 text fonts in varying type sizes. Graphics images created can be stored and combined into composites. Users can prepare reports, presentations, labels, slides and overhead transparencies. The system can also be used for architectural design, a spokesman said.

The Danford Presentation Design System is priced at $1,500.

Danford, 350 W. Fifth St., San Pedro, Calif. 90731.

MASSCOMP CORP.
SP80/SP82 Siggraph Core; SP84 Contouring; SP86 Metafile

Masscomp Corp. has announced three graphics software products for its MC-500 series of minicomputers and workstations under Masscomp's Unix-based RTU operating system. The three products are said to provide users with virtual input, device-independent and two- and three-dimensional graphics capabilities.

The Siggraph Core System SP80/82 is said to be suited to users of computer-aided design and manufacturing graphics, solids modeling and very large-scale integration design. According to the company, the program supports two- and three-dimensional graphics primitives, two-dimensional window-to-viewport mapping, three-dimensional viewing and clipping and perspective projections. It is priced at $1,200.

The SP84 is a set of subroutings that render two-dimensional contours and three-dimensional data. It reportedly allows generation of a variety of contour plots, including randomly located and evenly spaced data, and produces plots from any perspective with hidden-surface removal. The SP84 is priced at $450.

The SP86 Metafile system is said to allow users to save graphics sessions, created via the Siggraph Core system, in a device-independent metafile. The metafile reportedly can position, scale, superimpose or assemble several graphics sessions to create more complex graphics images. Metafile sells for $350.

Masscomp, One Technology Park, Westford, Mass. 01886.

INTEGRATED PLANNING, INC.
Stratagem link to 1-2-3

Integrated Planning, Inc. has announced a microcomputer-to-mainframe link between its Stratagem integrated decision support system for IBM mainframes and Lotus Development Corp.'s 1-2-3.

According to a spokeswoman, the link to 1-2-3 enables mainframe users to upload spreadsheet data created in 1-2-3 into Stratagem. Stratagem mainframe users can also send data into a 1-2-3 work sheet on an IBM Personal Computer. Stratagem runs on IBM mainframes in IBM's CMS and TSO environments. It combines data base management functions with analysis and reporting tools and programming capabilities.

The spokeswoman said the link allows Personal Computer users to create spreadsheets in 1-2-3 and upload them to Stratagem, where they are converted into Stratagem arrays. Micro users can also download "slices" of Stratagem arrays, which are automatically converted into 1-2-3 spreadsheets. Users at remote sites can access corporate data residing in Stratagem to populate their 1-2-3 spreadsheets.

The micro-mainframe link to 1-2-3 is included in the $85,000 perpetual license fee for Stratagem.

Integrated Planning, 338 Newbury St., Boston, Mass. 02115.

THETA BUSINESS SYSTEMS, INC.
TSX-Plus version upgrade

Theta Business Systems, Inc. has announced an upgraded version of its accounting software packages for S&H Computer Systems, Inc.'s TSX-Plus operating system.

The company has also announced the Pascal 2 version of the Pascal Development system. Developed for use with Digital Equipment Corp.'s RT-11 operating system, the Pascal Development system can run under TSX-Plus as a single job or for multiple users. Included with the accounting systems, the Pascal Development system contains an Isam file handler and more than 50 utilities.

Permanent license for an upgraded accounting software system is $995. The Pascal Development system comes free with Theta accounting packages. Separately, it carries a permanent license fee of $750.

Theta Business Systems, 1100 Sonora Ave., Glendale, Calif. 91201.

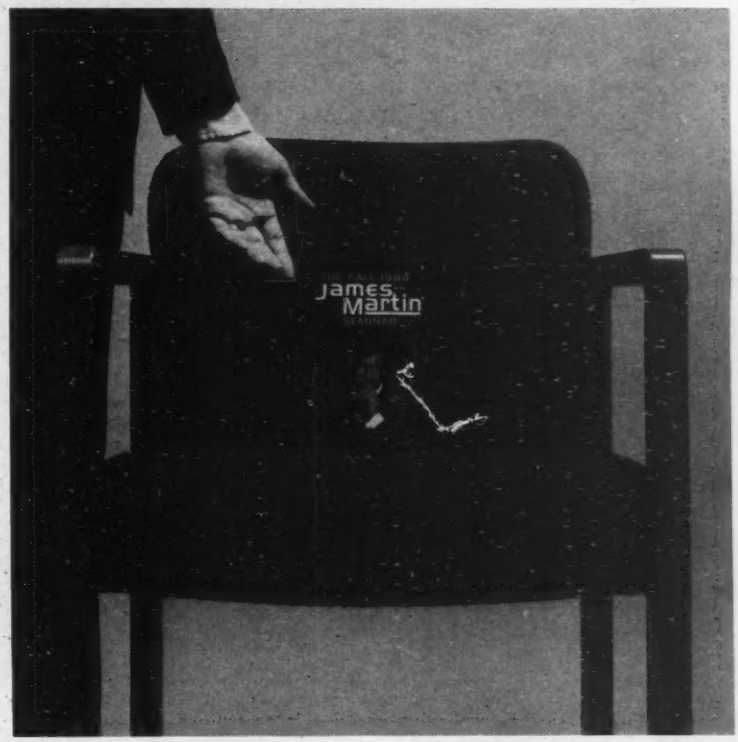
APPLICATION DEVELOPMENT SERVICES
Inventory management system

An inventory management system for the IBM System/36 minicomputer was announced recently by Application Development Services.

According to the company, the program can be used as a management tool for forecasting sales and in-

Continued on page 76

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SOFTWARE & SERVICES

Continued from page 75

ventory requirements. The program is said to interface with existing inventory and sales orders. The menu-driven inventory management system is interactive where operator input or output is required. Jobs are executed from the job queue to free the workstation for use. The system is written in RPG-II and is also available for the IBM System/34.

The system has a one-time license fee of $1,500.

Application Development Services, 1700 E. Dyer Road, Santa Ana, Calif. 92705.

DATAMATICS MANAGEMENT SERVICES, INC.
General Ledger

Datamatics Management Services, Inc. has announced a general ledger system with report generating capabilities.

The stand-alone General Ledger system runs on any Datapoint Corp. minicomputer under Datapoint's Datashare operating system.

The General Ledger system has the capability of interfacing with up to six other existing software systems, such as accounting or order processing, to capture data and transform it into journal entries with audit trails and hard-copy listings, according to the vendor.

The report writer function allows report formats to be altered to the specific needs of the user, the vendor said.

The General Ledger system is priced at $1,500, according to the vendor.

Datamatics Management Services, 330 New Brunswick Ave., Fords, N.J. 08863.

HEWLETT-PACKARD CO.
HP 7550A graphics software

Hewlett-Packard Co. has announced that 14 third-party software packages are available for use with the HP 7550A graphics pen plotter.

According to a spokesman, the third-party packages include nine for microcomputers: Lotus Development Corp.'s Symphony; Chart-Master and Sign-Master from Decision Resources, Inc.; Graphwriter from Graphics Communications, Inc.; Microsoft Chart from Microsoft Corp.; Diagraph from Computer Support Corp.; Cadplan from Personal CAD Systems, Inc.; Autocad from Autodesk, Inc.; and Series 100/Graphics from HP.

The remaining five packages are for mainframes and include Tell-A-Graf and Dissplа from Issco Graphics, Inc.; DI-3000 and Grafmaker from Precision Visuals, Inc.; and SAS/Graph from SAS Institute, Inc.

The HP 7550A pen plotter works with the full line of HP processors and features automatic cut-paper feed that handles up to 150 sheets of paper in a single fill; front panel display and function keys; a plotting speed of 31½ in./sec; and a replot feature to enable the plotter to repeat a graph up to 99 times without reprogramming. It is priced at $3,900.

HP, 3000 Hanover St., Palo Alto, Calif. 94304.

PRIME COMPUTER, INC.
GNC

Prime Computer, Inc. has announced an interactive numerical control software package for its Prime 50 series computers that programs machine tools used for metal cutting operations.

According to a spokeswoman, the Graphical Numerical Control (GNC) system is used within the manufacturing engineering environment to produce numerical control machine tool tapes. The tapes can then be used to control the functions of a variety of numerical control machine tools.

GNC runs on the full line of Prime 50 series computers under the Primos operating system, and it supports a variety of monochrome and color graphics terminals. It is available as a 2½-axis system with an optional upgrade to a three-axis capability.

The price for the 2½-axis GNC system is $35,000, and the three-axis option costs an additional $15,000.

Prime Computer, Prime Park, Natick, Mass. 01760.

AMERICAN SOFTWARE, INC.
Real-Time Vendor Performance Analysis & Rating

American Software, Inc. has announced an optional feature for its Purchasing and Materials Management System. The Real-Time Vendor Performance Analysis and Rating feature runs on IBM's 370, 30 and 4300 series computers under IBM's Vsam with CICS.

The feature includes: performance information, such as percentage ratings; on-line, real-time vendor inquiry for up to two previous years; and user choice of parameter requirements. Twenty-six screens are available for review of information by sorts.

Price of the Vendor Performance Analysis and Rating feature is $16,000.

American Software, 443 E. Paces Ferry Road, Atlanta, Ga. 30305.

WOOD ASSOCIATES
Zip Code Generator Information System On-Line Module

Wood Associates has introduced a data file to allow users to custom-integrate city, town, state and Zip Codes into their data base files. The Zip Code Generator Information System On-Line Module is currently formatted for the IBM Personal Computer running under Microsoft Corp.'s MS-DOS operating system, but can be reformatted for other operating systems, the vendor said.

The complete module has 100,000 names directly accessed by Zip Code numbers. Sectional modules and separate state modules are also available.

Complete system module price is $3,000.

Wood Associates, 44 Harvard St., Charlestown, Mass. 02129.

DISTINCTIVE SOLUTIONS CORP.
CFS/3000 Revolving Loans System

Distinctive Solutions Corp. has announced software for the processing, maintenance and monitoring of a variety of revolving lines of credit. The CFS/3000 Revolving Loans System runs on Hewlett-Packard Co.'s HP 3000 computer running under HP's MPE5 operating system.

This software may be used for reporting detailed summary and trend information and for specialized inquiries, including payoff computations and the listing of all loans that violate user-defined operational conditions.

Price of the CFS/3000 starts at $100,000, depending on the configuration of the user's equipment.

Distinctive Solutions, 1305 Marsh St., San Luis Obispo, Calif. 93401.

DATA BASE MANAGEMENT SYSTEMS

DIGITAL ANALYSIS CORP.
Unify 3.1 for Perkin-Elmer Corp. 7300 series workstations

Digital Analysis Corp. (DAC) has announced that its Unify 3.1 data base management system is now available on Perkin-Elmer Corp. 7300 series workstations running the Uniplus port of Unix and on the PE

Continued on page 78

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Making multi-vendor office systems work together requires just one thing.



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The idea seems simple enough: connect all of your office systems so that documents can be freely interchanged for editing, storage, display, and printing. That includes word processors, PCs running word processing packages, and mainframe terminals accessing DCF and PROFS.

Many vendors claim to connect multiple vendors' equipment through "protocol translation." And connect they can, but not communicate. To really communicate requires transforming the document coding so that it is fully editable at the receiving system.

Soft-Switch is compatibility

ITI's Soft-Switch is a program product for your IBM mainframe (MVS or VM) that allows users to send documents to other users with document translation performed automatically, to store documents in host libraries, and to retrieve documents from these libraries.

Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF and with PROFS; with the IBM 6670 laser printer, and with standard hard copy printers.

Soft-Switch is totally consistent with evolving standards for office systems. In fact, Soft-Switch integrates multi-vendor office environments by first translating a document into IBM's level 3 Document Content Architecture (DCA), and then into the exact format required by the receiving workstation.

Soft-Switch solves today's problems

Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (which executes in the PC, as well as in the IBM host) and specifies distribution to his secretary's Wang word processor and to the 6670 laser printer down the hall. Soft-Switch provides the micro/mainframe link, transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer OCL format, and routes the documents to their final destinations.

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SOFTWARE & SERVICES

Continued from page 76

3200 series minicomputers running Edition VIII, a port of Unix Version 7.

PE has agreed to market Unify as a PE-supported product. Ports of Unify have been announced for PE's Xelos operating system running on the 3200 series and for the PE 7350.

Full license prices are $1,250 for the PE 7350, $2,995 for the PE 3205, $6,995 for the PE 3210-30 and $14,995 for the PE 3250 XP.

Digital Analysis, Box 2850, Reston, Va. 22090.

LANGUAGES

TELESOFT, INC.
Ada compilers validated

Telesoft, Inc. has announced that the Department of Defense's Ada Validation Organization recently validated two of Telesoft's Ada language compilers.

According to a spokesman, the Ada compilers were designed for Motorola, Inc.'s 68000 microprocessors under the Unix operating system. The compilers are targeted to Sun Microsystems, Inc.'s Sun 120 microcomputer and Callan Data Systems, Inc.'s Callan Unistar 300 micros.

Telesoft will have an early release of the validated compilers in October, the spokesman said. It reportedly will distribute early versions of the compilers packaged with its enhanced partial language compiler in a product called the Telesoft-Ada Development Kit Plus. The Development Kit Plus will be priced at an initial fee of $5,200.

Telesoft, 10639 Roselle St., San Diego, Calif. 92121.

UNIPRESS SOFTWARE, INC.
Amsterdam Compiler Kit

Unipress Software, Inc. has announced the Amsterdam Compiler Kit for any computer based on the Motorola, Inc. 68000 chip that runs under the Unix operation system.

Developed at the Vrije University of Amsterdam, the kit is a package of C and Pascal language compilers and assemblers designed to simplify the task of producing portable compilers and interpreters needed for microcomputers and minicomputers. It contains the sources of all programs plus internal documentation describing how to make the needed modifications, the vendor said.

The Amsterdam Compiler Kit is available at $9,950, or $995 for educational institutions. Object code for the Digital Equipment Corp. VAX-11 computer running under University of California at Berkeley Unix 4.2 is priced at $4,500.

Unipress Software, Suite 312, 2025 Lincoln Highway, Edison, N.J. 08817.

CALLAN DATA SYSTEMS, INC.
DOD Validation of Ada on Unistar

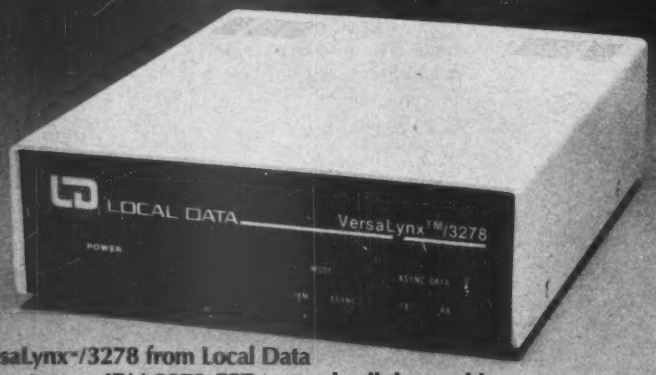
Callan Data Systems, Inc. has announced that its Unistar supermicrocomputer has been tested by the Department of Defense to run the Telesoft, Inc. Ada language compiler.

The Department of Defense reportedly requires all military contractors to run the Ada language by 1985.

The Unistar microcomputer reportedly uses a Motorola, Inc. 68000 microprocessor, operates under the Unix System V operating system and is priced at $19,950. The Telesoft Ada compiler for the Unistar is priced at $3,500.

Callan Data Systems, 2645 Townsgate Road, Westlake Village, Calif. 91361.

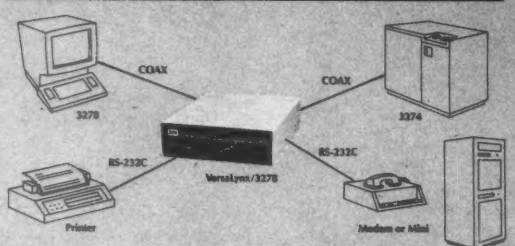
IBM 3278 to ASYNC



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Equipped with an auxiliary RS-232C printer port, menu setup and keyboard control of IBM or ASYNC mode, the VersaLynx™/3278 disconnects the IBM CRT from the controller and converts IBM CRT keyboard sequences to ASCII characters and passes them to the main ASYNC port.



State-of-the-art design allows scrolling of the IBM CRT at high data rates.

And, the IBM 3278 customer can dialup IBM mainframes using low cost asynchronous modems at 1200 or 2400 baud and a matching Local Data protocol converter at the host end.

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REMOTE COMPUTING SERVICES

HALE SYSTEMS, INC.
Financial Planning System

Hale Systems, Inc. has introduced a commercial bank industry version of its Financial Planning System (FPS). FPS is a computerized forecasting and planning model for thrift institutions.

Enhancements reportedly include bank regulations and stock calculations for use by either savings and loan or commercial institutions. Enhanced customizing features allow institutions to add new accounts to their model.

The new base rate feature allows restructuring of the interest rate forecast of the balance sheet with a minimal amount of data input, the vendor said.

Four pricing plans are available. Two of the plans include FPS and customer service consultants.

For one day's consulting, the price is $1,500 and includes all computer resources. A quarterly plan for one year is $6,000 and includes all resources. Dial-up rates for a month-to-month lease are $275/mo plus computer resources. A three-year plan includes a fixed amount plus a flat $30/hour for connect time, according to the vendor.

Hale Systems, Inc., 1044 Northern Blvd., Roslyn, N.Y. 11576.

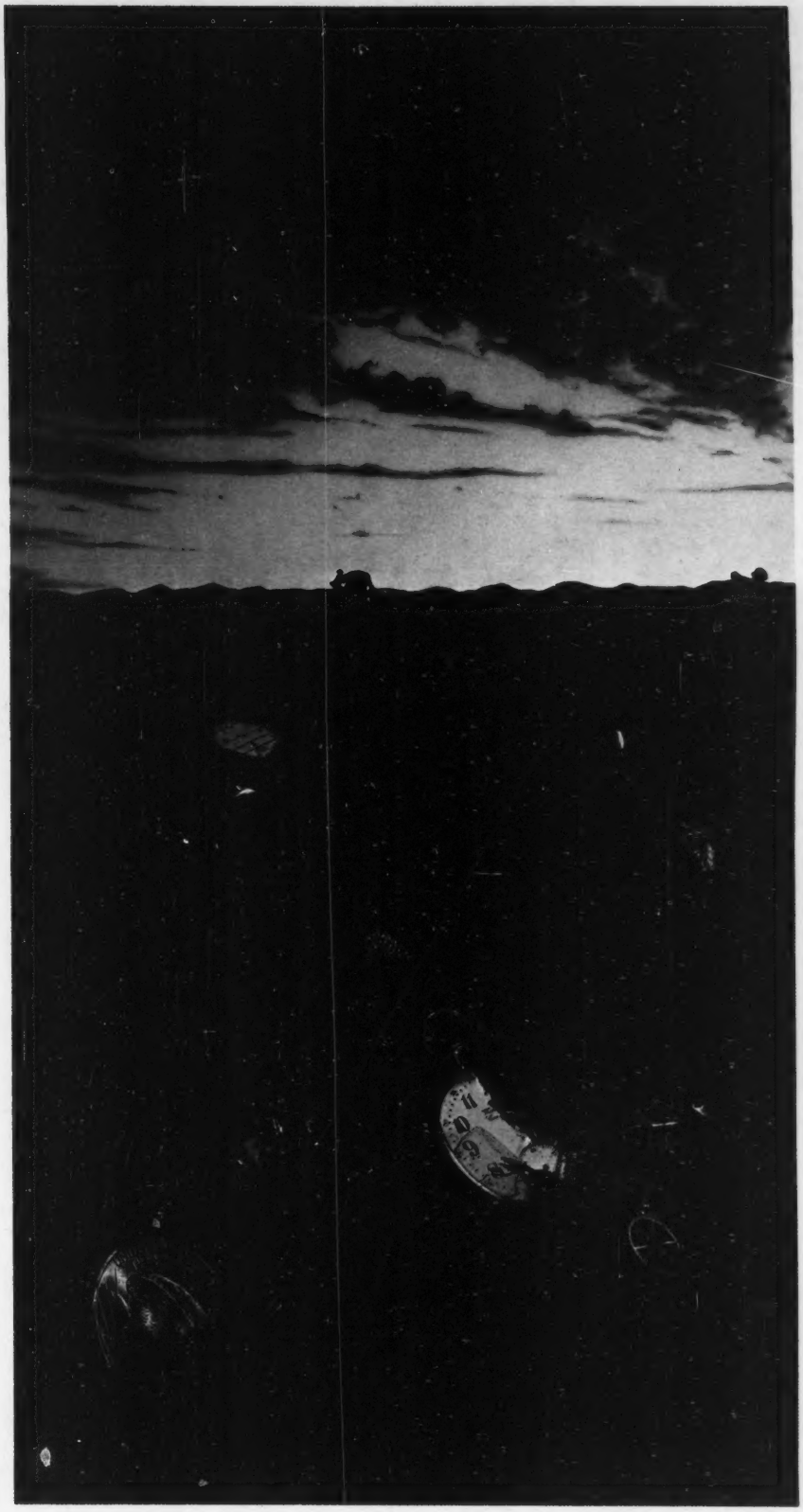
ON-LINE DATA BASES

DOW JONES & CO., INC.
Dowquot

In a cooperative venture with Quotron System, Inc., Dow Jones & Co., Inc. has introduced an electronic information service that provides securities quotes and business news after 6 p.m. on a fixed fee basis.

Dowquot offers quotes on stocks, bonds, options, commodities and market indexes plus dividend, earnings and other financial data. It also provides access to news articles and

Continued on page 80



Peat Marwick technology has exploded the myths about computer systems development: It doesn't have to take forever or cost the earth.

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PEAT MARWICK

Accounting and Auditing/
Tax Services/Management Consulting/
Private Business Advisory Services

SOFTWARE & SERVICES

Continued from page 78

statistics that have appeared within the previous 90 days in *The Wall Street Journal*, *Barron's* and the Dow Jones News Service, according to the vendor.

Subscribers will have access to the 28 data bases in Dow Jones News/Retrieval, accessible through personal computers, communicating word processors, compatible terminals and CATV systems.

Dowquot is available from 6 p.m. local time to 6 a.m. Eastern Standard Time, at $100 for 20 hours of usage per month. Users are billed five cents per minute for any time above that amount.

Dow Jones & Co., 22 Cortlandt St., New York, N.Y. 10007.

COMPUSERVE, INC.
Videotex Social Security information
Disclosure II and Disclosure/Spectrum

Compuserve, Inc. has added Social Security information to its videotex services. Both Compuserve Executive and Consumer Information subscribers have access to information about wage protection and the benefits available under Social Security, how Social Security is financed and other material.

Compuserve has also added the Disclosure II and Disclosure/Spectrum data bases to its Executive Information Service and the newly created Disclosure/Spectrum ownership data base.

Disclosure extracts information from reports filed with the U.S. Securities and Exchange Commission. The Disclosure/Spectrum data base contains data on major shareholders of more than 5,000 companies.

The new services are available at no additional charge to current subscribers. For new subscribers, a starter kit is available for $89.95 for the Executive Service or $39.95 for Consumer Information. Usage charges are $6/hour at night and $12.50/hour during daytime hours.

Compuserve, P. O. Box 20212, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

ADP NETWORK SERVICES, INC.
Promt data base

ADP Network Services, Inc. has announced the Promt data base, containing textual information on industries, markets, companies, products and technology.

According to a spokesman, the Promt data base, compiled by Predicasts, Inc., contains abstracts of more than 400,000 business-related articles published since 1980.

The abstracts reportedly are drawn from more than 1,500 publications ranging from general interest and business periodicals to highly specialized journals. Also included are studies of industry and market trends and information on more than 100,000 public and private companies.

Many abstracts also contain numerical information displayed in tabular format, the spokesman said.

Promt is accessible through ADP's screen software, with which users search, retrieve and display information from ADP's other numeric-oriented data bases.

Promt can be accessed through ADP's traditional remote computing services, through the ADP/Onsite service and through ADP's Datapath service, which makes ADP data bases available to microcomputer users.

There is no subscription fee for use of Promt. Connect time ranges from $15/hour to $30/hour, and users pay a flat fee of $2.25 for each abstract reported.

ADP Network Services, 175 Jackson Plaza, Ann Arbor, Mich. 48106.

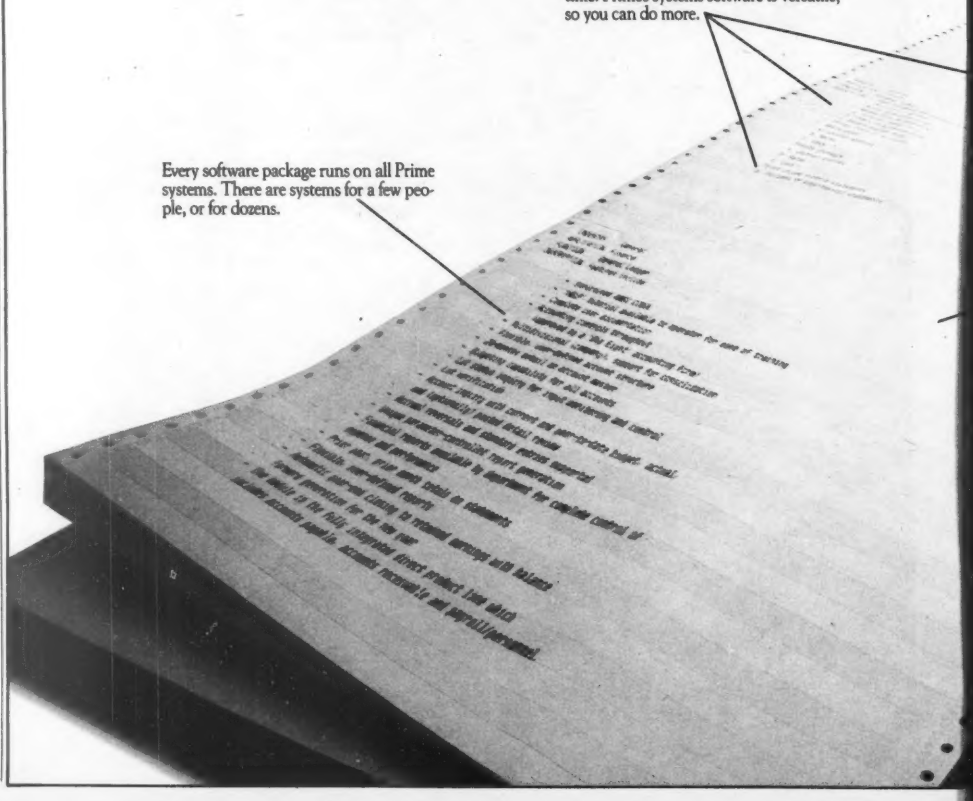
INFORMATICS GENERAL CORP.
Net-Search

Informatics General Corp. has introduced an on-line information retrieval service said to assist information managers to search on-line library catalogs or private data bases.

Net-Search is suitable for data bases containing 5,000 or more records and for first-time computer users, the vendor said. The service reportedly provides on-line searching of library catalogs, private data base searching and retrospective conversion of card catalogs to machine-readable form.

To access the data base, a user dials a telephone connected to the terminal of a microcomputer equipped with telecommunications software and a modem.

S/38
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SOFTWARE & SERVICES

Net-Search is priced according to size and number of records in a data base. For example, a library data base consisting of 5,000 average-size records costs less than $5,000 a year, the vendor said.

On-line search charges are additional and cost $35/hour or 50 cent/min.

Informatics, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

CANADA SYSTEMS GROUP LTD.
Dunserve II

Canada Systems Group Ltd. (CSG) has introduced a marketing information service that provides access to information on more than 550,000 Canadian businesses. Dunserve II is accessed by any terminal with communications capabilities.

Some typical uses of Dunserve II would be to identify companies within a target geographic area or industry sector, locate newly started businesses, identify chief executive officers or generate prospect lists.

This service costs $180/hour connect time, plus $1 per record of information (Canadian rate). Large volume users are eligible for discounted connect time.

Canada Systems Group, Suite 704, 90 Sparks St., Ottawa, Ontario K1P 5B4.

NATIONAL LIBRARY OF MEDICINE
Medline subsets

The National Library of Medicine has announced subsets of its Medline bibliographic data base for use on personal and institutional computers. The library will provide citations from Medline and its backfiles on magnetic tape and diskettes.

According to a spokesman for the company, more than four million citations from biomedical journal articles from 1966 to the present are available. Subsets may be defined by subject, its time period and journal title.

Prices vary with the size of the subset and the medium of distribution and depending on whether updates are chosen and whether the subset is intended for use by one person or by more than one. Those leasing subsets are prohibited from republishing, duplicating or offering the subset for sale to others, the spokesman said.

Medlars Management Section, National Library of Medicine, Building 38A, Room 4N421, Bethesda, Md. 20209.

WESTERN UNION NEWS BUREAU
Trade

Western Union News Bureau has announced that its Telex and Easylink subscribers can access the International Business Clearinghouse's (IBC) service to buy, sell or exchange goods or services both domestically and overseas. IBC is now included in Western Union's FYI service, a computerized data base, and is known as Trade.

The Trade category lists five different clearinghouses: Barter/Countertrade, Bids and Buying, Inventory/Liquidation, Sellers and Media.

Companies wishing to list goods or services (which must have a value of $15,000 per item or group of items) are charged $150 by IBC for a six-month listing in the data base. IBC also charges a transaction fee ranging from 6% to 10% percent of the value of each sale made.

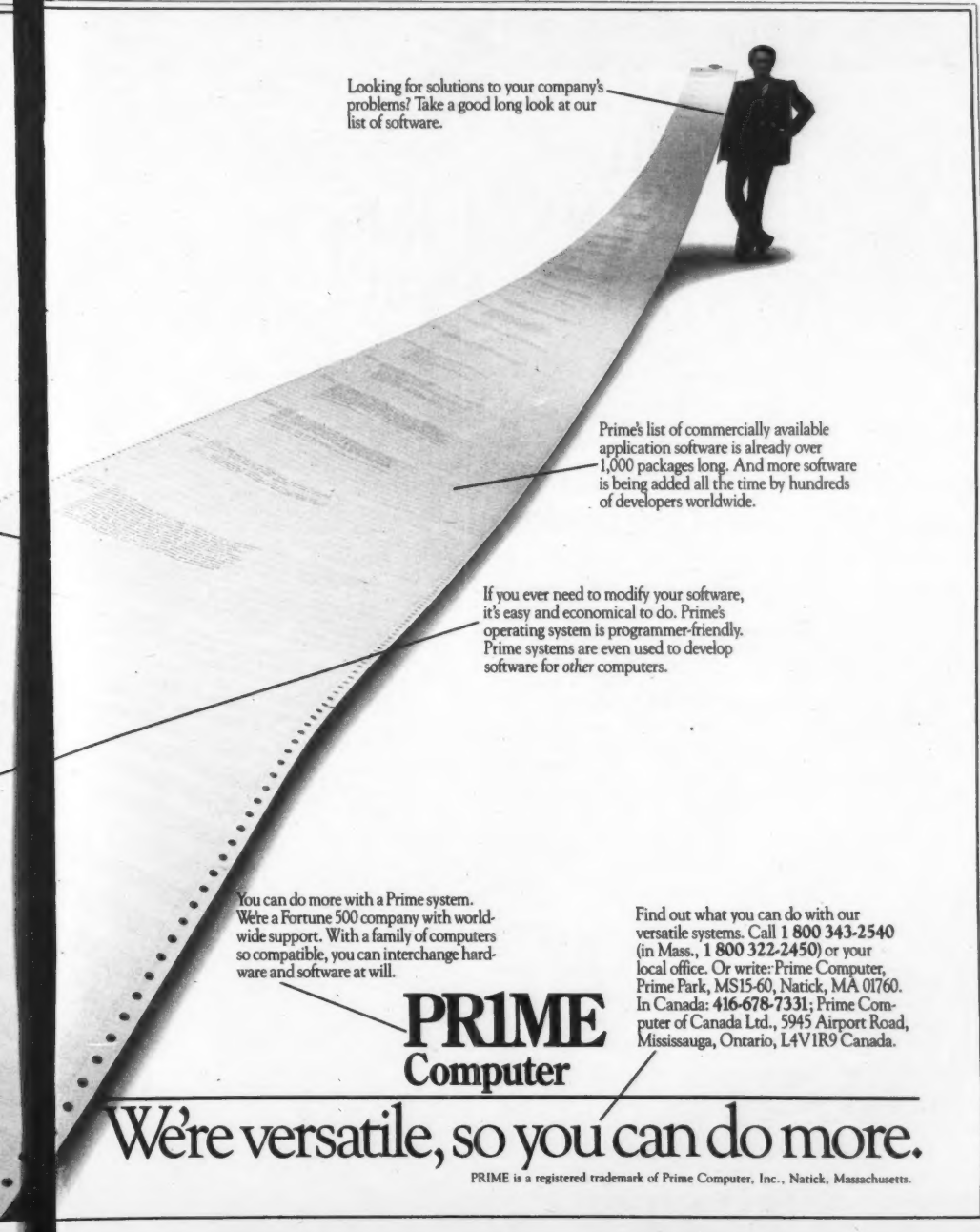
Western Union News Bureau, One Lake St., Upper Saddle River, N.J. 07458.

METHODOLOGIES

SPECTRUM INTERNATIONAL, INC.
Spectrum 2

Spectrum International, Inc. has announced a new version of its system development methodology that is directed to the use of structured analysis and design techniques for data

Continued on page 82



THE UNIX* SYSTEM
ENCYCLOPEDIA



The UNIX System Encyclopedia is the largest available collection of information about the UNIX marketplace. Over 400 pages are filled with a comprehensive UNIX directory including 100 pages of manufacturer specifications and photographs, software reviews, and articles on the UNIX system.

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* UNIX is a trademark of Bell Laboratories

SOFTWARE & SERVICES

Continued from page 81

processing management. The Spectrum 2 methodology is designed to use an array of modules.

The price of the Spectrum 2 hardcopy version ranges from $40,000 to $70,000, depending upon the user's needs, and a disk version can be added for $10,000, according to the vendor.

Spectrum International, Suite 150, 6101 W. Centinela Ave., Culver City, Calif. 90230.

TRAINING

DATA PROCESSING EDUCATIONAL CORP.
Computer-based training courseware

Data Processing Educational Corp. has added five new generic computer-based training courses for the Goal Systems International, Inc. Phoenix mainframe presentation/authoring system.

The new courses are: Using Statistical Analysis Systems, which carries a permanent license fee of $5,000 or a $500 monthly rental fee; Business Writing, available for $4,000 for a permanent license, $400 per month; CBT Phoenix Guidelines, available for $3,750 for a permanent license or $375 per month; Time Management, which has a permanent license fee of $3,250, or $325 per month; and Instructional Development, available for $3,240 for a permanent license or $325 per month.

Each course is written in the Phoenix Ease authoring language and includes an instructional section and users guide.

Data Processing Educational, 458 Kenny Road, Columbus, Ohio 43220.

CRWTH COMPUTER COURSEWARES, INC.
CMS for End Users

Crwth Computer Coursewares, Inc. has introduced a computer-based training course for end users of IBM's CMS.

"CMS for End Users" is an interactive course that teaches students by allowing them to enter data, create files and execute commands. Much of the course involves writing CMS statements and programs. The course can be run under computer-based training presentation systems such as IBM's IIS or IIPS, Goal System International, Inc.'s Phoenix or Boeing Computer Services Co.'s Scholar/Teach3.

Cost for a one-year lease of the course is $3,125. Purchased with a perpetual license, it costs $9,375. The course can also be leased as part of the full Crwth CBT Information Center curriculum.

Crwth Computer Courseware, Suite 200, 613 Wilshire Blvd., Santa Monica, Calif. 90401.

CRWTH COMPUTER COURSEWARES, INC.
New version of "Using Ramis II"

Crwth Computer Coursewares, Inc. has announced a release of the interactive, computer-based training course "Using Ramis II."

This release reflects the latest version of Mathematica Products Group, Inc.'s Ramis II (Release 83.2). The course can be run under a computer-based training presentation system such as IBM's IIS, Goal System International, Inc.'s Phoenix or Boeing Computer Services Co.'s Scholar/Teach 3.

Information is presented with interactive text, followed by questions to reinforce the instruction and to give users hands-on experience. Much of the course involves writing Ramis II statements and programs.

"Using Ramis II" can be leased on a yearly basis for $4,200 or purchased for a perpetual license of $12,600.

Crwth Computer Coursewares, Suite 200, 613 Wilshire Blvd., Santa Monica, Calif. 90401.

MVC ASSOCIATES, INC.
Xedit courses

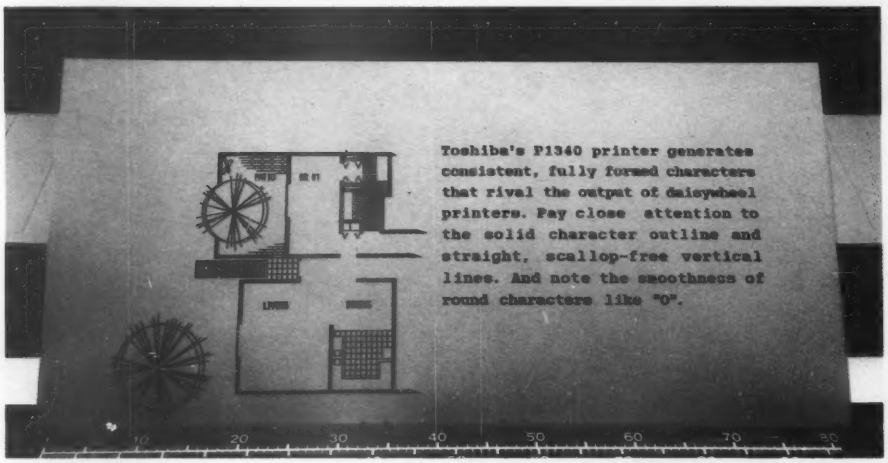
MVC Associates, Inc. has announced an addition to its interactive computer-based training library. "Xedit for New Users" is a five-module course that uses full-screen simulation techniques and is self-instructional.

The course is designed for new users of IBM's Xedit software. Course objectives include understanding Xedit concepts, identifying areas of the Xedit screen, creating a file and locating data.

"Xedit for New Users" can be purchased for $2,800 or leased at $1,700/year.

MVC Associates, 849 N. Summit Ave., Lake Forest, Ill. 60045.

See **TRAIN** page 90



Now you can make a great impression for under a grand. The Toshiba P1340 3-in-One printer.

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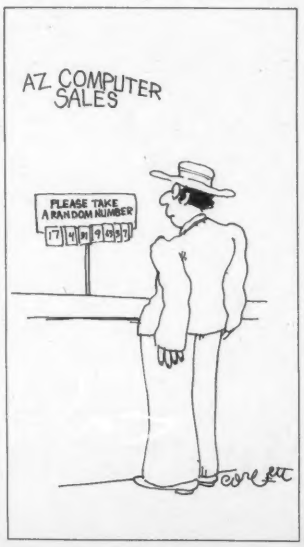


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In Touch with Tomorrow

TOSHIBA

TOSHIBA AMERICA, INC. Information Systems Division



INSTRUCT from page 69

So often these tools are given low priority during the system development cycle. After spending a great deal of effort developing the system, there is usually a last-minute rush to produce the training program and user manual, often by the programming staff. The programmers are usually not interested or even qualified to deliver these items. In either case, the result is usually a half-hearted effort to simply "get something out."

The user manual and training program are tools that will help to assure the success of a system. There are many good systems that are underutilized because the user manual or training program failed in its purpose.

The training period is the first time the majority of users will encounter the system. You must ensure that the user manual and training programs present the system in a logical and understandable fashion, one that utilizes the right combination of pictures, words and practical application.

The user manual is the first step to assure success. User manuals for large computer systems (especially those with interactive dialogs) should be designed to be:

- Easily understood.
- Tailored to the specific user group.
- Expandable for system growth.
- A combination of verbal and visual information.
- Easily maintained.
- Meaningful to the beginning or advanced user.

Technical terms should be kept to a minimum. Terms that cannot be avoided should be thoroughly defined. If a term is too complicated to explain, draw a picture. One way to avoid the terminology trap is to have the user involved in writing the manual; another way is to never let programmers get involved.

Tailor your documentation to be used by the experienced user or the beginner. This can be done by having selected details — such as keying instructions for a particular transaction — in a separate section of the manual to provide an experienced person with a quick reference, while having another section contain more general instructions for each transaction.

End-user training is the second step to success. This training can be conducted in a classroom or may be an on-line training program based on data presented in the user manual.

The training program usually involves actual execution of selected system functions using specific test situations. The training should also be tailored to fit the various groups that will use the system and instruct them only in the areas that relate to their scope of responsibility. This apparently obvious point is often overlooked.

A Help facility is a key factor because it answers questions only when requested by the user and with data in a format familiar to the user because it originates from the user manual.

Have the users do most of their training at a terminal. An interactive training program allows users to learn at their own speed, thus allowing them to spend the time needed in those areas that are more difficult and to speed through those areas that they find easy.

After a training package has been developed, do not rush out to train an army of users. Give the program to a pilot group and get feedback on where they did not understand the data and what the weak points were.

Consider developing a library of documentation and training components. Many topics are repeated from system to system and should not be repetitively developed. For example, if an application generator is being used for system development, documentation for standard features (sign on, security, screen control, menus and so forth) can be designed as reusable components for other systems.

If a document processor is used when developing these tools, such as IBM's Script facility, common components can easily be included. Stay away from media that cannot be easily maintained or enhanced. A new system will go through changes and documentation, and training will too.

While the tools are important, selecting people with the right combination of experiences is critical. Important skills include leading-edge data processing technology, technical writing, training skills and communication skills. And do not forget to include someone from the user community.



Data Design's Financial Software Tops Datamation Survey.

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Αυτή η βελτιωμένη παραλλαγή του αρχικού μικρο – DBMS μπορεί να διεπεραιώσει ένα δισεκατομμύριο εγγραφές. ΄Ετσι μπορείτε να αυτοματοποιήσετε μία επιχείρηση με πραγματικές εφαρμογές πλήρους δυναμικότητος.

Εξ άλλου, το dBASE III είναι γρήγορο. Στη λειτουργία και στο διαχωρισμό. Είναι επίσης ευκολώτερο στη χρήση από το προηγούμενο του με το να δέχεται ισχυρές αλλά απλές εντολές που είναι το καλύτερο πράγμα μετά από το να μιλάει κανείς English. Υπάρχει επίσης μία εντολή ΒΟΗΘΕΙΑ (HELP) σε περίπτωση που δυσκολεύουν τα πράγματα. Συνοδεύεται ακόμη και από ένα διδακτικό εγχειρίδιο.

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GEMENT SYSTEMS

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Requires 256K of memory. Runs on MS-DOS and PC/DOS operating systems.

DIALOG from page 69

grammable function keys and messages and tutorial support. Other capabilities include table-handling services and something called file tailoring.

The bottom line is that any installation that has ISPF also has in the dialog manager a generalized application development system that supports the generation of custom applications that run under TSO — and it is all very easy to use and even faster to develop.

The major attraction of the dialog manager applications is ease of use, in addition to the short development time required to produce a relatively powerful and sophisticated foreground system. A screen is developed simply by building a card image member of a partitioned data set, where each card image represents one line of the screen. Literals and variables are then keyed into their proper position on the line and preceded by a special attribute character — and that is all. There is no compile or assembly — the dialog manager displays screens directly from source code.

Processing that takes place behind a dialog manager screen can be provided by a program (Cobol, PL/I, assembler) or a Clist. Clist processing is particularly attractive since it also is an interpretive language, although it obviously will not perform as well as a compiled program. Furthermore, special commands are provided with the dialog manager to allow programs or Clists to access the dialog manager services. These services include screen displays with associated messages, table access and update and file tailoring commands.

Table processing is a dialog manager feature that allows for quick, easy definition of two-dimensional tables (with key fields and data fields) that perform with surprising efficiency. It also provides a multitude of table maintenance commands used for searching and updating rows of defined tables. The use of the dialog manager tables together with the dialog manager screens provides a simple but inexpensive data base/data communications capability under TSO.

One of the most attractive features of the dialog manager tables and screens is their use of common variables. Suppose, for example, that a screen has been defined for the entry of a transaction code (RETRIEVE or CHANGE), a customer number and a customer name. Suppose also that a table has been defined that is keyed by customer number and stores customer name for each entry.

A very simple program or Clist can be written to display the screen and accept transaction codes. For RETRIEVE, the program simply issues a table retrieve command. Then the dialog manager uses the customer name from the screen and automatically searches the table. If found, the program redisplays the screen, where the dialog manager has automatically moved the customer name from the table to the screen. In other words, when common variables are defined between the dialog manager screens and tables, values for these variables need not be explicitly moved, thus greatly simplifying program logic.

Similarly, when a user changes a customer name on the screen and invokes the CHANGE transaction, the program simply issues a table replace command, and the table is updated with the current values of its variables.

File tailoring is a capability that allows for skeleton files to be tailored, either temporarily or permanently, using variables that apply to a particular transaction.

For example, a skeleton file can be prebuilt to contain Job Control Language (JCL) statements used to perform a batch program compile, and a dialog manager screen can be defined to request execution of this JCL. The user might enter a program name on the screen. File tailoring is used to substitute the program name from the screen into the skeleton JCL. It can also substitute the user's logon identification into the job card in the skeleton file. Then the tailored JCL is submitted to perform that specific program compile for that specific user.

The skeleton file remains unchanged, so it is available for the next user. This technique is probably the most popular use of the dialog manager and can be implemented to provide an entire subsystem of development support aids.

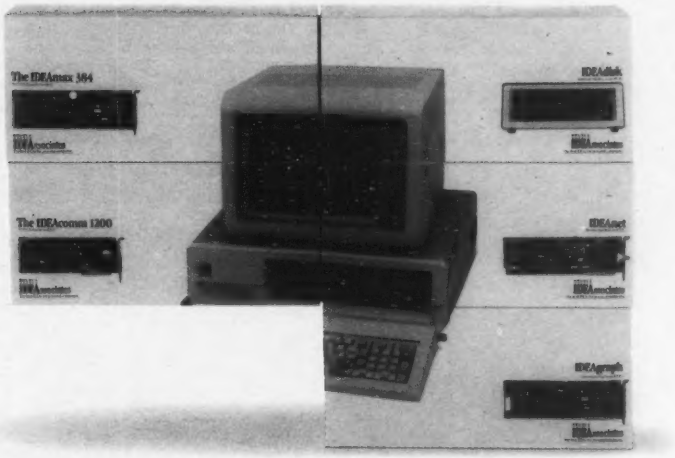
Other useful capabilities of the dialog manager include program function key support. Under the standard ISPF PDF, programmable function keys can be defined to provide for such functions as split screen, a return function to allow jumping from one option to another and a Help key to provide tutorial information on the screen. These keys function the same way under user-developed dialog manager applications as they do under the PDF.

The dialog manager message support provides for the display of screen messages either explicitly (based on program logic) or automatically (based on conditions that are tested by the dialog manager). Messages can consist of a short message displayed in the upper right corner of the screen, a long message displayed across the third line of the screen or a series of tutorial screens. The short, long and tutorial messages, if all present, are progressively displayed by the dialog manager, thus providing the user with more information as needed.

Obviously, the dialog manager is not the solution for all on-line systems. But for the proper applications, either in-house or production, it has the advantages of a quick learning curve, short development time and powerful features. And for those installations that already have ISPF, it has the right price.



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INTRODUCING THE AT&T



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AT&T INFORMATION SYSTEMS. WHEN YOU'VE GOT TO BE RIGHT.

AT&T



TRAIN from page 82

SPSS, INC.
Training seminars

SPSS, Inc. has announced a series of training seminars for users of its mainframe SPSS statistical software, its SPSS-X information analysis system and the microcomputer version SPSS/PC statistical analysis package on the IBM Personal Computer/XT.

According to a spokeswoman, SPSS/PC is an integrated statistical analysis and report-writing package that provides on-line Help facilities and micro-to-mainframe data transfer for quantitative analysis. SPSS/PC applications include reporting and statistics in quality control and market research.

Among the public seminars to be offered in the company's fall 1984 training program are "Introduction to SPSS/PC," "SPSS/PC for SPSS Users," "Census Data and SPSS-X," "Making the Transition From SPSS to SPSS-X," "Introduction to SPSS-X for New Users" and "Report Writing With SPSS-X."

The seminars cost between $195 and $395 and are held in addition to SPSS' on-site training seminars, the company said.

The dates and locations of the training seminars are available from SPSS.

SPSS, 444 N. Michigan Ave., Chicago, Ill. 60611.

LINK from page 69

respond better to the challenge of linkage than they did to the earlier challenge of the micro.

'DP's reactionary approach'

It is not surprising that Input chose to preface its findings on the future of shared micro-mainframe applications by highlighting DP's reactionary approach to the advent of corporate micros — an approach that did little to foster rapport with end users or to facilitate the best possible use of that powerful technology.

"Many [information systems] managers were unaware of the micro phenomenon. Others did nothing, and some viewed the micro as a threat to orderly data processing," the study stated. "Toward the end of the early micro period, many [information systems] departments recognized the micro and took steps to control, or at least to coordinate, its use.

"Most [information systems] managers agree that their [micro] actions have been reactive and have generally not been a major influence on the amount or extent of end-user [micro] use."

It is dismaying to note that Input found most DP departments eyeing the link in terms of control — one of the same mistakes they made with the micro.

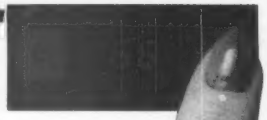
Key elements

Coordination and planning, based on mutual trust and understanding between DP and end users, are clearly the key elements for the successful implementation of link technology in the years to come. Control is simply one small facet of coordination. It should not be the sole consideration for a DP manager encountering the unique opportunities links will offer to expand his shop's capabilities and better meet the information needs of his corporate customers.

But planning and coordinating require a bigger commitment than simply controlling. "One of the problems that many MIS departments exhibit is that they are pretty good at weighing and assessing objective needs, [but] they aren't quite so good at weighing and assessing the organization's qualitative needs. They have a hard time understanding the need for things like autonomy and local control," O'Flaherty said.

So, at the risk of sounding repetitive, now really is the time for DP professionals to begin summoning all their planning and evaluating skills — not to mention their human relations talents — to deal with the linking of micros and mainframes that will occur in the months and years to come. There is no maybe here that linkage will happen. And, as far as the vast potential of linking micros and mainframes is concerned, the future will belong to those with foresight.

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And, nine easily installed forms handling options that can accelerate your printed output even more. Spinwriter printers also have an enviable record for reliability.

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For more information on the Spinwriter 8850 or our two companion models, just call NEC Information Systems at: 1-800-343-4419; in Massachusetts call (617)264-8635. Also available at: Entre, 1-800-HI ENTRE: Sears Business System Centers, 1-800-228-2200; and Computerland stores, (In California) 1-800-321-1101; (Outside California) 1-800-423-3308. Find out why more and more IBM PC users are saying, "NEC and me."



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COMMUNICATIONS

AT&T seeks to downgrade access quality

AUSTIN, Texas — As the nation's long-distance communications carriers seek connections to local telephone systems that are of equal quality to those that AT&T Communications enjoys, that company is looking to downgrade its quality of access in some areas.

AT&T recently requested Southwestern Bell Corp. to provide it with lower quality interfaces for incoming trunks terminated in Texas. That company, however, claimed that if it provided these lower cost connections to AT&T, it would lose $300 million in access charges.

In a hearing two weeks ago, where AT&T argued that Southwestern Bell's losses would be only $50 million, the Texas Public Utilities Commission denied AT&T's request. This will, according to an AT&T spokesman, push the matter into the courts.

See AT&T page 94

FCC debates subsidiary ruling



WASHINGTON WIRE
Phil Hirsch

A major battle is under way at the Federal Communications Commission over whether the divested Bell operating companies should be allowed to offer services that provide end-to-end protocol conversion directly or through separate subsidiaries.

This is of particular interest to end users because the divested Bell operating companies are proposing rates far below those charged by Tymnet, Inc., GTE Telenet Communications Corp. and other well-established packet-switching carriers that offer similar services.

New Jersey Bell Telephone Co. and the other operating companies are barred at the moment from directly offering enhanced services by the FCC's Second Computer Inquiry decision and other decisions. As a result, the operating companies can only offer services that provide things like end-to-end protocol conversion through separate subsidiaries, unless they obtain waivers. Several operating companies have submitted waiver applications to the commission.

The cost of establishing and maintaining those subsidiaries would increase the cost of the services offered.

In a recent filing submitted to the FCC, New Jersey Bell estimated that if it were allowed to offer directly a local data service known as Local-Area Data Transport Service, customers would pay 60 cent/kilopacket (1,000 data packets), including protocol conversion. The same service would cost $2.25/kilopacket if it had to be provided through a separate subsidiary. GTE Telenet charges $1.19 to $1.70 for the same service, depending on volume.

Considering the reduced rates promised by carriers like New Jersey Bell and other local telephone companies, it seems certain that Telenet, Tymnet and other

See BELL page 94

INSIDE

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Local-Area Networks/94

Navy creates document transfer software requirements

WASHINGTON, D.C. — The U.S. Navy, equipped with office automation systems from most major vendors, has established software interface requirements to allow its users to manipulate documents and transfer them among the differing systems.

After helping to establish the specifications for the software, Datapoint Corp., one of the three vendors that worked closely with the Navy on the project, announced formal compliance with the Document Interchange Format (DIF).

The Navy DIF identified 45 functions necessary to transfer documents. Where possible, it adopted coding standards developed by the Ansi X3V1 and X3L2 committees. Using a seven-bit coded Ascii character set, the DIF was designed to be closely compatible with the Ansi Office Document Architecture.

A Navy spokesman said Datapoint, Xerox Corp. and Data General Corp. worked closely with the Navy, which has nine vendors' office automation systems just in the Office of the Secretary of the Navy. He added that Wang Laboratories, Inc. and Digital Equipment Corp. are working to comply with the internal standard.

The DIF project began in April 1983, when potential vendors were told by the Navy that naval officials wanted suppliers to comply with a standard if they were to do business with the Navy in the future. In addition, the spokesman said there is a chance that the standards will be adopted by the Department of Defense. The vendors were asked to develop software converters that adapt document transmissions to and from the standard.

"We feel the DIF is a 95% solution — it addresses the essentials of document transfer. This was our greatest need. We are solving the biggest problems, areas

See NAVY page 94

Star Technologies announces token access local network

IRVINE, Calif. — Star Technologies, Inc. has announced a local-area network designed to support up to 255 devices, including its own Star computer family, IBM Personal Computers and minicomputers in the Data General Corp. Nova class.

Starnet is said to use a token-access technique on a coaxial cable with a 2.5M bit/sec transmission rate. According to the company, Starnet's concept is the same as that being explored by IBM.

Terminals, personal computers and minicomputers are connected to the network using boards with an RS-232C interface that supports Datapoint Corp.'s Arcnet interface protocol.

Individual transmission is said to be at 2M bit/sec with each transmission checked and verified for accuracy during transmission.

Three networking boards, each with 128K-bytes of dual-access memory, are available. One is for the IBM Personal Computer and the IBM-compatible Star Technologies Tripower P/BC. The second board is for Ampex Corp. D-150 and D-170 terminals and the third is for the Star Nanostar, Microstar and Ministar and Nova-class systems. The third board allows the computer to act as a file server.

Starnet interfaces reportedly support IBM-compatible Microsoft Corp. MS-DOS applications. Also, Star Technologies' Downline Multiplexer is said to interface with the network for multiport asynchronous communications.

An interface board that allows a Star Technologies computer to act as file server costs $1,500, while a similar board for another Nova-class system costs $3,050. Boards for Ampex terminals cost $950, and boards for personal computers cost $800. The products will be available in late October.

Star Technologies is located at 5 Studebaker, Irvine, Calif. 92718.

Anacomp aims Bankserv version at smaller ATM, POS networks

INDIANAPOLIS — Anacomp, Inc. recently unveiled a transaction switching system that is said to give smaller institutions capabilities normally reserved for larger banks.

The low-cost version of its Bankserv 10800 transaction switching and processing switch is intended for use in small- to medium-size automated teller machine (ATM) and point-of-sale (POS) networks.

The Bankserv 10800/LXP was designed for networks of less than 100 ATMs.

According to the vendor, the switch gives smaller institutions the ability to control their own ATM/POS networks on a 24-hour, seven-day-a-week basis, to select their own partners, to interface with other networks and to off-load their mainframe computers.

The system is based on a Perkin-Elmer Corp. 3205, part of the Perkin-Elmer line of 32-bit Megamini computers.

Features are available on a modular basis and allow the Bankserv 10800/LXP to operate as a front end for a bank's host system, as a stand-alone on-line electronic funds transfer (EFT) system, as an interactive on-line network interface or as an intercept processor between a host and regional or national EFT switch, Anacomp said.

It is available with disk and tape drives as a single processor for $80,000 or as a redundant system for $140,000.

The software costs $160,000, and installation costs about $40,000, Anacomp said.

An Anacomp spokesman said the switch can handle up to three million transactions per year, but is targeted at networks handling one million or less transactions.

More information is available from Anacomp, which is located at 11550 N. Meridian St., Indianapolis, Ind. 46240.

COMMUNICATIONS

VOICE/DATA COMMUNICATIONS

MICROPERIPHERAL CORP.
Voicelink

Microperipheral Corp. has introduced a high-quality voice message system that ties input and output directly to the telephone and controls up to 48 voice channels.

Using proprietary human voice digitizing techniques and a Charles River Data Systems, Inc. Universe 68 supermini programmed in C language, Voicelink transmits and records human voice messages. It reportedly allows a call to be delivered with or without an operator on the line to front the message. The called party can respond to the message verbally or via Touch-Tone or rotary dialing. In addition, the Voicelink system compiles user response statistics.

Base price for a turnkey Voicelink system with 16 lines is $115,000. Smaller configurations are available. The cost of a 48-line system is $200,000.

Microperipheral, 152nd Ave. N.E., Redmond, Wash. 98052.

NETWORK SWITCHING SYSTEMS, INC.
N16 Switch

Network Switching Systems, Inc. has announced a high-capacity digital switch said to provide circuit switching, packet switching, time division multiplexing, advanced routing and control capabilities.

The N16 Switch reportedly combines voice, data, image and video transmissions on the same circuits and can be used with all wide-area media, including terrestrial, satellite, radio, microwave and fiber-optic facilities.

The basic unit features an aggregate throughput of 16M bit/sec full duplex and is expandable to 64M bit/sec, according to the vendor.

Each port reportedly will handle transmission speeds ranging from 50 bit/sec to 1.544M bit/sec. Optional features are network management tools, redundancy, protocol support and accounting.

Evaluation units will be available early in 1985, with quantity orders being filled by the summer of 1985.

Prices, including software, range from $50,000 to $150,000, depending upon the desired options, with a typical switch costing about $125,000, according to the company.

Network Switching Systems, 3 Dundee Park, Andover, Mass. 01810.

PROTOCOL CONVERTERS

LOCAL DATA, INC.
Datalynx/5251

Local Data, Inc. has announced a protocol converter said to enable IBM System/34, 36 and 38 processors to support asynchronous peripherals.

The Datalynx/5251, which is said to offer a user-changeable password security feature, can support up to nine asynchronous display terminals or printers that are connected to the IBM host via an RS-232C serial interface port. The product reportedly emulates all functions of IBM's 5251 keyboard.

The Datalynx/5251 CPU features a 16-bit Intel Corp. 8086-2 microprocessor with a user-changeable, programmable, read-only memory cartridge capacity up to 128K bytes and 28K to 108K bytes of random-access memory.

Prices of the Datalynx/5251 range from $3,900 for a three-port version to $6,000 for a nine-port version.

Local Data, 2771 Toledo St., Torrance, Calif. 90503.

INNOVATIVE ELECTRONICS, INC.
MC-8051

Innovative Electronics, Inc. has announced a protocol converter designed to let up to nine Ascii terminals, personal computers and printers communicate with an IBM System/34, 36 or 38.

The MC-8051 reportedly appears to the host computer as an IBM 5251-12 display station and requires no modification to host software.

It is said to make asynchronous Ascii terminals appear to the host as IBM 5251-11 workstations or IBM 5292 display stations. Printers reportedly emulate the IBM 5256 printer.

A five-port unit costs $4,650.

Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

SOFTWARE

CMI CORP.
Remote/1

CMI Corp. has announced that it is exclusively marketing Hunssberger Data Systems, Inc.'s Remote/1 IBM EDX-based network management system for the IBM Series/1 minicomputer.

Targeted at large Series/1 networks and software development firms, Remote/1 was designed as a support and maintenance tool.

It reportedly allows a network manager at a central site to inspect main memory and disk, load and execute programs, execute system commands, send new software and bug fixes, reinstall the initial program load and record an entire session in a log file.

Perpetual licenses cost $5,500 for the central site and $1,000 for each remote site.

CMI, 2600 Telegraph Road, Bloomfield Hills, Mich. 48303.

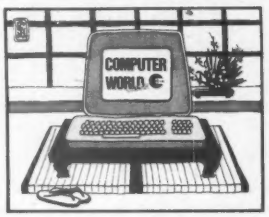
MULTIPLEXERS/MODEMS

INFOTRON SYSTEMS CORP.
TL300

Infotron Systems Corp. has announced a time-division multiplexer that supports up to six synchronous input channels over a link operating

Continued on page 94

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Gary Morgenthaler *Relational Technology*
Irene Nesbit *Nesbit Systems*
Bruce Weiner *Digital Research*
Donal O'Shea *Amdahl Corp.*
William Joy *Sun MicroSystems, Inc.*
Daniel Lankford *AT&T Technologies*
Karan Kauppila *Handle Corporation*
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Gil Steil *Digital Equipment Corp.*
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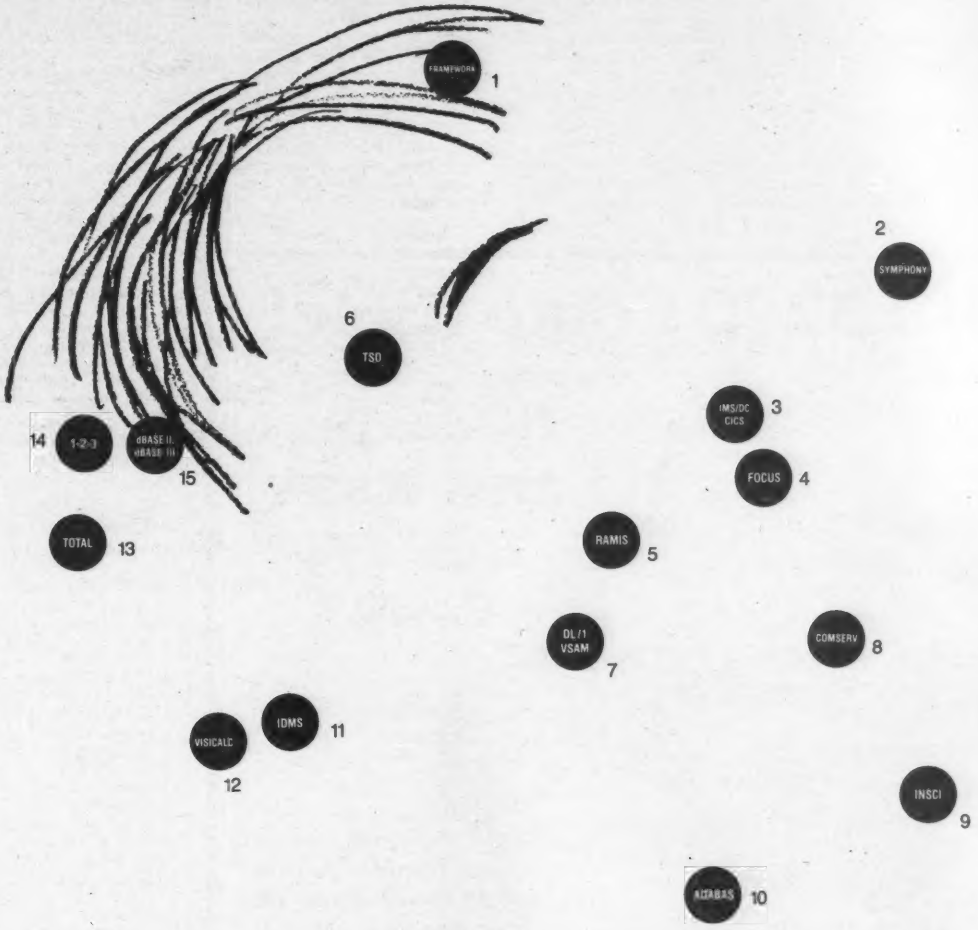
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informatics general corporation.

Continued from page 92

at speeds up to 64K bit/sec.

By connecting additional units to the first two channels of the TL300, the bit-interleaved, time-division multiplexer can provide up to 16 channels at a single site, the vendor said.

Price is $2,700.

Infotron Systems, 9 N. Olney Ave., Cherry Hill, N.J. 08003.

LOCAL-AREA NETWORKS

UNGERMANN-BASS, INC. NIU-130

Ungermann-Bass, Inc. has announced a network interface unit said to allow two RS-232 user devices to connect to an Ungermann-Bass Net/One local-area network.

NIU-130 is said to provide net access for half the previous price. The unit reportedly is supported on broadband, baseband, optical fiber and thin coaxial cable. The broadband model has an integral RF modem that transmits at 5M bit/sec, while other versions operate at 10M bit/sec.

The NIU-130 executes network communications protocols in an Intel Corp. 80186 microprocessor and features 128K bytes of random-access memory.

Scheduled to be available in November, the NIU-130 is priced starting at $1,400, according to the vendor.

Ungermann-Bass, 2560 Mission College Blvd., Santa Clara, Calif. 95050.

NAVY from page 91

where we can see an obvious cost/payback ratio. The DIF allows us to make use of existing resources and cope with a multivendor environment," said Commander Robert J. Gray, director of the Department of the Navy Office Automation and Communications Systems.

Gray noted that officials felt little immediate need to standardize graphics or voice transfers.

Chuck McCoy, Datapoint vice-president for product marketing, said, "Many of our [Attached Resource Computer] installations include foreign equipment, so we have had to think about these issues for a long time. Because of that, we were able to develop our interface first and provide some assistance to the other vendors."

AT&T from page 91

Explaining the request for the lower cost connections, AT&T Chairman Morris Tanenbaum, in a speech before the Texas-Oklahoma Telephone Association Conference, said that the "access-charge levels [in Texas] are some of the most disadvantageous to us in the nation."

These charges, the company claimed, are more than twice as much as its competitors pay for access to local telephone companies and have reportedly resulted in a $100 million revenue deficit for AT&T in Texas. The less expensive switch connections, Tanenbaum said, would enable the company to stay competitive.

The connections requested are known as Feature Group B. Traditionally, AT&T — and only AT&T — has used Feature Group C connections, the highest quality connections available. In its proposal, AT&T said it wanted to use the lower quality connections for trunks coming into Texas, while retaining Feature Group C connections for calls originating in that state. Use of Group C interfaces for outbound calls would give it the answer supervision capabilities needed for its method of billing.

The lack of answer supervision facilities available with Feature Group B and Group A interfaces have led to billing problems for some carriers.

BELL from page 91

established packet-switching vendors will oppose the waivers vigorously. This could lead to a protracted cat-and-dog fight at the commission that would delay the new service and the lower rates indefinitely.

Although these competitors contend that the operating companies' lower rates are based on surreptitious cross-subsidies, what really bothers them is the fear that the lower rates will entice many of their customers.

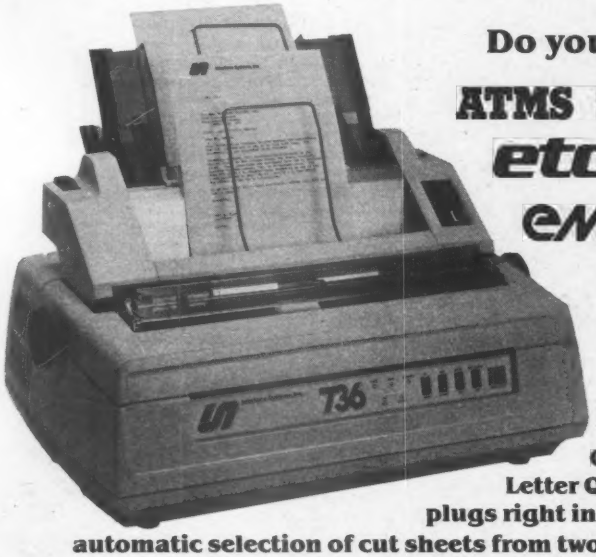
One way out of this box would be for the operating companies to offer access to their competitors at rates enabling the latter to remain competitive. Efforts along this line are apparently now under way.

One indication of this is that New Jersey Bell, in answer to a number of questions concerning the company's waiver application, told the FCC late last month that it "is willing to develop a service that would provide an access concentrator dedicated to use of another service provider." The company added that it is "prepared . . . to develop a protocol conversion service" using this equipment.

What New Jersey Bell would charge its competitors has not been disclosed, but the company indicated to the commission that the service could be offered on a contract or tariff basis. The contract would be one way of providing a bulk discount for volume usage.

In a recent interview with *Computerworld*, Bell Atlantic Vice-President A. C. Tedesco said he had talked to both the FCC and various value-added carriers about this idea and had received an "encouraging response" in all cases.

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Ask about the ISI-487, too, a high speed dot matrix printer that allows you to tear off output immediately, without wasting forms. Also prints large characters for labels.

SYSTEMS & PERIPHERALS

Filenet offers processor to reduce paperwork

COSTA MESA, Calif. — Filenet Corp. has announced the Document-Image Processor optical disk storage, retrieval and workflow processing system, aimed at reducing paperwork in mid-size and major companies.

Available in January, the system uses optical disks, manufactured by Hitachi America, Ltd., which are said to be capable of storing 20,000 printed pages or 1G byte per side. The system consists of four products: the Document Entry Station, the Image Management System, the Integrated Workstation and the Print Station, linked by an Ethernet-based network.

The system offers the following features: simultaneous access to up to 20 million document images; retrieval of images at an approximate rate of 1M byte of data in seven seconds; simultaneous display of document images; IBM-3270 and Digital Equipment Corp. VT100 protocol emulation; single-step image and data entry; and the company's AT&T Unix-based Workflo software, which allows document images to be processed from terminal to terminal, the vendor said.

The system includes Filenet's Osar optical storage and retrieval library, which can hold up to 64 optical disk cartridges for use on up to four optical disk drives. An Osar library can store 64G bytes on-line with single-side optical disks and 128G bytes with

See FILE page 97

Reference unveils optical ROM system

BOULDER, Colo. — Reference Technology, Inc. has announced the Computer/Laser Access System for Information Exchange (Clasix), an optical read-only memory (ROM) system for delivering volumes of data to desktop computers via the Small Computer System Interface.

The system consists of three components: the Clasix Dataplate, a 12-in. laser-optic disk that carries 1G byte of data per side; the Clasix Datadrive Series 2000, a peripheral that reads data from the Dataplate; and the Tridecc Premastering System, a minicomputer-based service that converts information into a format necessary for Dataplate production. The company said it has run the system on Digital Equipment Corp. VAX-11s and PDP-11s, and that other systems can be supported.

Information stored on a Dataplate can be digital data, video still frames, full-motion video, analog or digitized audio and digitized high-resolution images, the company said. The Datadrive reportedly offers a 125-msec average seek time and is said to be capable of reading mixed video, audio and digital information from the Dataplate when augmented with a video option kit.

In the premastering service offered by Reference Technology, information is converted and encoded from ½-in. magnetic tape to videotape, the company said. The videotape is used as the prima-

See DATA page 97

■ Qume Corp. recently announced price cuts on its QVT-102 and QVT-108 editing terminals/96

INSIDE

Terminals/96

Pertec adds desktop model to System 3200 supermicro line

IRVINE, Calif. — Pertec Computer Corp. has announced its desktop Model 3220 for the System 3200 family of business supermicrocomputers based on the Motorola, Inc. 68000 microprocessor.

The company also announced that its System 3200 desktop computers now support up to 16 users, up from previous support for five users, with the addition of the Advanced Station Controller add-on board.

The Model 3220 features from 512K bytes to 1.5M bytes of main memory. It comes with either 26M bytes or 53M bytes of Winchester hard-disk storage and a built-in 47M-byte streaming cartridge tape for high-speed backup. The Model 3220 is capable of supporting up to 100M bytes of hard-disk storage.

The System 3200 supports the company's OS/3200 operating system, as well as AT&T Unix System V and the Pick operating system by Pick and Associates, Inc. When the OS/3200 operating system is used, workstations are linked to the CPU by a multidrop coaxial cable connection. The cable is said to increase transmission speed to 10 times that allowed by RS-232 connections. When Unix is used, RS-232 interfaces are employed, the company said.

The Model 3220 supports a number of languages including Ryan-McFarland Corp.'s RM/Cobol, MAI/Basic Four Information Systems, Inc.'s Basic Four and SMC Software Systems-compatible Basic, the company said.

Prices for the Model 3220 range from $14,000 to $19,000, depending on configuration, according to the company. The price for a System 3200 with 16-user capacity, 512K bytes of random-access memory and 53M bytes of Winchester disk storage is $17,500.

Pertec Computer is located at 17112 Armstrong Ave., Irvine, Calif. 92713.

STC follows IBM; cuts price on peripherals

LOUISVILLE, Colo. — Add Storage Technology Corp. (STC) to the list of IBM plug-compatible manufacturers that have lowered prices in response to IBM's late August price cuts on its 3080 series mainframes and key peripherals.

STC last week announced a 10% reduction in the purchase price of its 8380 disk drive and 8880 disk controller.

The pricing action lowers the purchase price of an 8380 from $70,170 to $63,150 and reduces the price of the 8880 from $65,575 to $59,020. In addition, all options for the 8880 also were cut by 10%, according to the company.

The 10% figure is the same margin by which IBM lowered its purchase prices on the 3380 disk drive and 3880 disk controller in late August [CW, Sept. 3].

Unlike IBM, STC chose not to change the rental or lease prices on its 8380 or 8880.

Honeywell office systems debut

By John Desmond
CW Staff

BILLERICA, Mass. — Honeywell, Inc. has announced two office systems based on its DPS 6 minicomputer — the 16-bit Office Management System (OMS) 40, with two models, and the 32-bit OMS 90, with five models.

The systems, to be delivered in January, support from four to 34 users and run under Honeywell's Gcos 6 operating system. The OMS 40 offers from 1M to 2M bytes of main memory and up to 40M bytes of disk storage. The OMS 90 offers up to 4M bytes of main memory and is available with either 134M or 512M bytes of storage. Users can optionally add up to 1.1G bytes of disk storage, the vendor said.

Communications features of the systems reportedly include electronic mail, binary synchronous communications, compatibility with IBM's Systems Network Architecture protocols and all hardware necessary for synchronous and asynchronous communications.

A feature of Honeywell's menu-driven Office Automation Systems software offered with the systems is a spelling corrector based on an 80,000-word dictionary. Four dot matrix printers, running up to 400 char./sec and 132 columns, and three letter-quality printers, running up to 40 char./sec and 132 columns, can be added to the systems.

The price of a DMS 40 Model 1 with 1M byte of main memory; a 40M-byte cartridge disk unit; a 5¼-in., 650K-byte diskette; up to four RS-422A workstation ports; up to four RS-422A printer ports; an RS-232C communications port; and OMS software is $32,250.

An OMS 90 Model 1 with 2M-byte main memory; two 40M-byte cartridge disk units; a 5¼-in., 650K-byte diskette; up to 14 RS-422A workstation ports; up to six RS-422A printer ports; four RS-232C communications ports; and software is priced at $78,500, Honeywell said.

Honeywell is located at 300 Concord Road, Billerica, Mass. 01821.

Unix workstation also announced

BILLERICA, Mass. — Honeywell, Inc. has announced its first AT&T Unix-based product, the Microsystem NX workstation, targeted to engineering and application development and based on the Motorola, Inc. 68000 microprocessor.

The workstation runs on the Uniplus+ operating system and Unix System III with University of California at Berkeley 4.1 extensions, the vendor said. It features a 15-in. bit-mapped display screen with 720- by 560-pixel resolution; a 113-key low-profile keyboard; 512K bytes of main memory and 64K bytes of display screen memory; a 5¼-in., 655K-byte diskette; two RS-232C asynchronous ports; and either 12M bytes or 18M bytes of disk storage.

The Uniplus+ Runtime Software Package is standard with the system, and application program development software can be added. The price of the 12M-byte version is $8,895; the 18M-byte version costs $9,495.

Honeywell is located at 300 Concord Road, Billerica, Mass. 01821.

TERMINALS

MICROTOUCH SYSTEMS, INC.
DEC Kits

Microtouch Systems, Inc. has announced a series of touch-screen kits designed for Digital Equipment Corp. terminals and microcomputers.

The DEC Kits are available for the DEC Rainbow and Professional 350 microcomputers, the VT220 and VT240 terminals and the VT100 series terminals. The screens are said to enable OEM and system integrators to configure their DEC equipment with a touch-sensitive screen offering 1,024- by 1,024-pixel resolution. With the screen, users can select from menus, position the cursor and create and manipulate graphics by touching the display, the vendor said.

The DEC Kit includes the same touch screen, controller and standard firmware as the vendor's Point-1 Monitor. The touch-screen controller is fully programmable, allowing bit/sec rates, data formatting, calibration and modes of operation to be controlled by the host computer. The controller is also available with electrically erasable programmable read-only memory.

The touch screen has a resolution of 1,024 by 1,024 pixels.

The DEC Kit is priced at $1,595.

Microtouch Systems, 400 W. Cummings Park, Woburn, Mass. 01801.

AT&T TELETYPE CORP.
Teletype 5425

A buffered display terminal, compatible with Digital Equipment Corp.'s VT102 terminal and Unix operating systems, has been introduced by AT&T Teletype Corp.

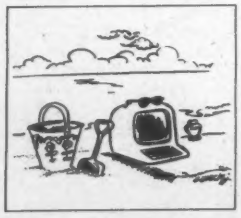
Teletype 5425 is an Ansi 3.64-based terminal with a detachable keyboard, eight user-programmable and eight host-defined programmable function keys, 38 downloadable function keys and 16 corresponding screen labels.

The terminal reportedly also has full-screen windowing capabilities. While full-screen windowing is being used, two additional windows can be opened, according to the company. Windows can overlap and vary in length and width, the company said.

An auxiliary printer port is available. Options include a 300 bit/sec to 1,200 bit/sec intelligent modem/dialer, said to allow the terminal to be plugged into a standard phone jack for remote transmission. The terminals will be available in October. List price is $1,400 for the basic 5425 terminal and $1,850 for the terminal with modem, the vendor said.

AT&T Teletype, 5555 Touhy Ave., Skokie, Ill. 60077.

See **HARD** page 97



Qume lowers prices, extends warranty

SAN JOSE, Calif. — Qume Corp. has announced price reductions and increased warranty periods for its QVT-102 and QVT-108 editing terminals.

The QVT-102 has been reduced by $100 to $595, and the QVT-108 was reduced by $200 to $695.

Warranties on the terminals have been increased from six to 12 months, the company said.

Applies to new purchases

According to Qume, the warranty increase applies to new distributor and end-user purchases of the QVT-102, QVT-103, QVT-108, QVT-211GX and QVT-109 terminals.

Keith Rapp, terminals division general manager, said the price reduction is a result of the company's maturing manufacturing process. The company's low warranty return rate allowed it to extend the warranty period, he added.

Further information is available from Qume, 2350 Qume Drive, San Jose, Calif. 95131.

Until not so long ago, the mainframe was the hub of the information universe.

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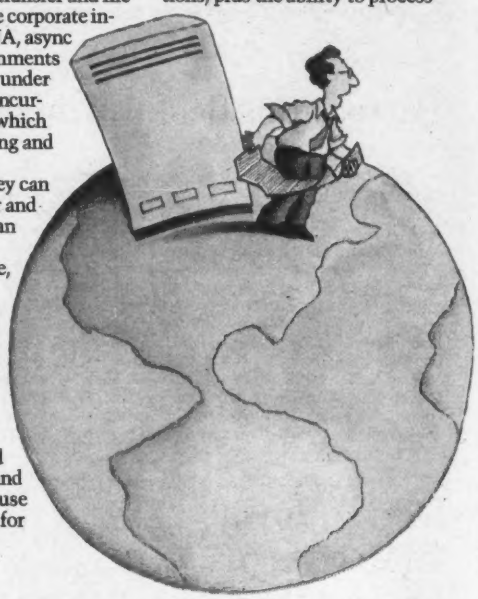
Exchange Series products consist of software on diskettes and printed circuit boards. They communicate over voice-grade or leased lines, as well as via coax cable.

So now, PC users company-wide can share, transfer and file the latest on-line corporate information in SNA, async or bisync environments on PCs running under PC-DOS. Or Concurrent™ PC-DOS, which allows windowing and multi-tasking.

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What's more, the Exchange Series is easy to upgrade. Additional software lets you add other protocols as you need them. To help keep micros and mainframes—and the people who use them—aligned for years to come.

SNA Exchange™ SNA/SDLC communications; 3274 cluster controller, 3278/9 terminal with multi-sessioning, 3287 printer and 3777-1 RJE workstation emulation. Provides toggling between DOS and 3270 functions, plus the ability to process



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SYSTEMS & PERIPHERALS

HARD from page 96

ITT COURIER TERMINAL SYSTEMS, INC.
ITT 9232

ITT Courier Terminal Systems, Inc. has introduced ITT 9232, an amber monochrome terminal that emulates an IBM 3180 Model 1 display.

The terminal features user selectable screen sizes, a logic base and choice of four keyboards, according to ITT. The four 110-key keyboards are typewriter format with numeric keypad and with a 24-program function pad in a clustered format, data entry format with numeric keypad and data entry format with 24-program function pad in a clustered format.

The ITT 9232 is said to possess dual logical units.

The ITT 9323 costs $2,230, the vendor said.

ITT Courier Terminal Systems, 1515 W. 14th St., Tempe, Ariz. 85281.

DATA from page 95

ry input to the Dataplate mastering process. Mastering can be performed by several third-party media manufacturers, including 3M Corp., Sony Corp. and Hitachi America, Ltd.

During the premastering process, Reference Technology's Tridecc error correction method is used for data integrity. Complete turnkey Tridecc systems will be sold to high-volume publishers, and Tridecc licenses will be sold to industrial customers for use in computer storage applications, the company said.

The company is targeting the Datadrive to OEMs and the Dataplate and Tridecc service to information providers.

The Datadrive Series 2000 costs $5,000 each in quantities of 100 and $3,325 in quantities of 1,500. With power supply, controller and Dataplate carrier, it costs $8,900 in quantities of 100 and $5,900 in quantities of 1,500. The price of the video option, to be available in second-quarter 1985, is $550.

The basic fee for the Tridecc premastering services is $2,500 per Dataplate side, plus $250 per additional reel of input tape. Dataplate costs range from $25 each for quantities of 100 to $14 for quantities of 2,500.

Reference Technology is located at 1832 N. 55th St., Boulder, Colo. 80301.

FILE from page 95

dual-sided media, the vendor said. A fully configured system is said to support up to eight Osar libraries.

An Osar library with single-sided disks reportedly holds the equivalent of over 100 five-drawer file cabinets and requires 1/24th the storage space.

Each document is entered into the system by a digital scanner in the Document Entry Station. The image is indexed on magnetic disk, mounted on an 8-in. Winchester disk drive and written to optical disk by the company's Osar Index Server. A mechanical device in the Osar library inserts and removes disk cartridges from their storage slots into Hitachi optical disk drives. Access time to data stored on a mounted disk cartridge is 200 msec, and access time to an unmounted cartridge is 12 sec, the vendor said.

Each Integrated Workstation can simultaneously display document images, interact with the mainframe and perform word processing in separate windows on the screen. The 20-in. diagonal screen reportedly can display two 8½-in. by 11-in. pages side by side.

Document-Image Processor is priced at $258,000.

Filenet is located at 1575 Corporate Drive, Costa Mesa, Calif. 92626.

records received from or destined for the mainframe.

File Exchange™ A file transfer software package that supports bi-directional transfer of data over coax or modem connections between PCs and mainframes running CICS, TSO and CMS applications.

Coax Exchange™ Lets a PC emulate a 3278/9 display terminal via coaxial connection.

Bisync Exchange™ *3270* Allows bisynchronous PC-to-mainframe communications; 3274 cluster controller, 3278/9 terminal and 3287 printer emulation.

Bisync Exchange™ *3780* Allows a PC to emulate a 3780 or 2780 Remote Job Entry workstation. Also provides PC-to-PC 4800-baud communication, with data transparency.

Async Exchange™ An add-on software package for asynchronous communication including DEC™ VT100/52 emulation between PCs and DEC as well as other asynchronous mainframes.

ClusterNet™ *3270 and ClusterNet*™ *3278* Allows a master PC to emulate a 3274 cluster controller, and up to 3 additional PCs to emulate 3278/9 terminals via a multi-drop twisted-pair cable.

PC Exchange™ Asynchronous communication between IBM PCs, and between PCs and asynchronous mainframes; DEC VT100/52 emulation; fully integrated telephone management system including electronic mail.

PC Exchange™ *with SNA* Combines the functions of SNA Exchange and PC Exchange in one complete package.



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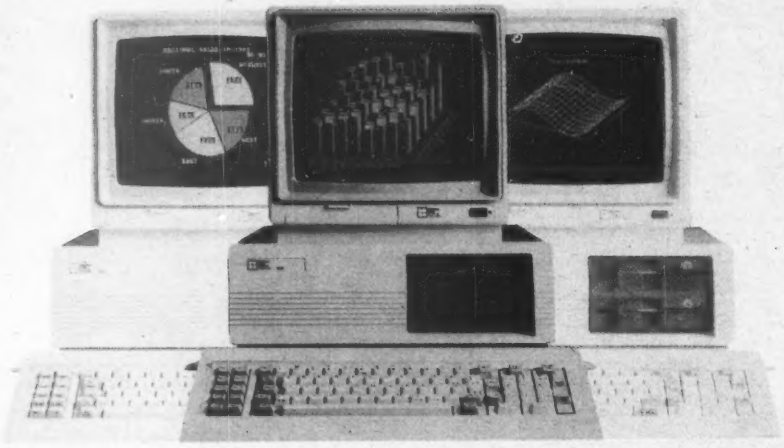
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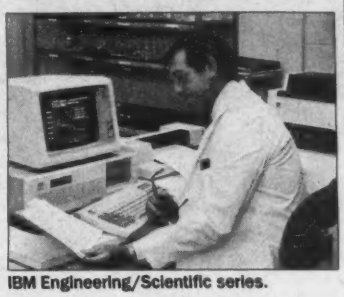
IBM announces graphics aids for micro line

By Paul Korzeniowski
CW Staff

BOCA RATON, FLA. — Hoping to brighten a dark area for its Personal Computer line, IBM has released a series of graphics products. Some of the offerings strengthen the Personal Computer's general graphics capabilities, while others are designed to transform the microcomputer into an engineering or scientific workstation.

The introductions answer a common user demand for improved Personal Computer graphics and also show IBM's intention to compete in another market segment, analysts commented.

"IBM really needed to alleviate the Personal Computer's weak resolution," said Gregory Kelsey, senior analyst at San Francisco's Hambrecht & Quist. "IBM had said that low resolution was sufficient for many personal computer applications, but many users had different opinions."



IBM Engineering/Scientific series.

"In themselves, the graphics announcements are not significant," claimed Michael Killen, president of Strategic, Inc. of San Jose, Calif. "They offer nothing radically different from products already on the market. But they are a signal to competitors that IBM plans to enter the low end of the computer-aided design market."

To boost the Personal Computers'

See IBM page 111

Upgraded Macintosh hits market early

By Eric Bender
CW Staff

CUPERTINO, Calif. — Apple Computer, Inc. has introduced an upgraded model of its Macintosh personal computer that features 512K bytes of internal memory and costs $3,195. Originally scheduled to debut early in 1985, the Macintosh 512K is shipping now, Apple said.

Apple also lowered the suggested price for a standard 128K-byte Macintosh to $2,195 last week and announced a $995 memory option that upgrades standard models to 512K bytes.

Industry analysts generally commented favorably on the new Macintosh. "It's a very important announcement," said Aaron Goldberg of International Data Corp. in Santa Clara, Calif. "Although 128K bytes wasn't the most important limitation for the [Macintosh], it was perceived that

See APPLE page 112

■ Visicorp introduces an IBM Personal Computer version of its Flashcalc entry-level spreadsheet program/**101**

■ Ashton-Tate's Dbase II is offered for Hewlett-Packard's Portable personal computer/**101**

■ Citicorp Information Services unveils data-access programs running on IBM micros/**101**

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Macintosh role in Fortune 1000 firms up in air

SMALL TALK
Eric Bender
CW Senior Editor

As Apple Computer, Inc. introduced the Macintosh 512K this month, company President John Sculley claimed that "a strong national accounts program has led to the signing of long-term, large-quantity sales agreements with more than 50 major corporations" for the Macintosh.

Deme Clainos, who oversees Apple's direct sales effort, estimated that such sales have quadrupled since Apple reorganized its national accounts organization in April.

But many outside Apple commented that the Macintosh still faces an uphill battle for its place in the sun among Fortune 1000 firms.

No reaction seen

"We really haven't seen any kind of a reaction in corporate America," said James Edgette, executive vice-president at Entre Computer Centers in Vienna, Va., which claims to be the largest computer chain selling strictly to businesses and professionals. Edgette added that the jury is still out, and the Macintosh may become a contender if popular software, like Lotus Development Corp. packages, becomes available.

The software shortage is not the Macintosh's only barrier to success, other observers maintained.

Everett Meserve of Arthur D. Little, Inc. in Cambridge, Mass., called the 512K Macintosh's expanded memory an imperative, but cautioned that the new machine "is not going to have a dramatic impact on the large business customer, at least in the short term." Meserve said that the introduction "certainly doesn't negate the other problems" Apple faces in that market, particularly the comfort that customers feel when buying from IBM.

Lack of networking hooks is another major handicap in the large business market, according to Chris Christiansen of Boston's Yankee Group. Apple expects third-party firms to fill in the network gaps, Christiansen noted, but he cast doubt on the strength of those efforts.

Among third-party developers, Da-

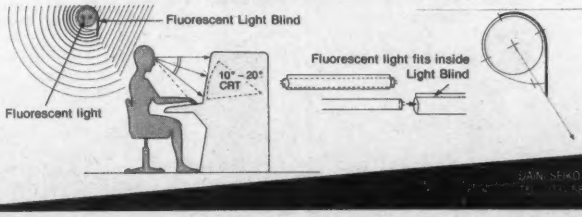
See 512K page 114

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New! Fluorescent Light Blind Patent pending.

Eliminates Glare on CRT Displays, Protects Operators from Eye Problems

With office automation continuing at an unprecedented pace, computers are becoming a familiar part of every office. Unfortunately, most office lighting was not designed with computers in mind—overhead fluorescent lights reflect on CRT displays, causing a variety of problems for operators, including eye fatigue and loss of efficiency because characters are difficult to read. Harmful effects are worse when office lighting is strongest, such as at night and on cloudy days. Fortunately, there's an easy answer to this problem—Fluorescent Light Blind. This product effectively eliminates glare on CRT displays to relieve common operator eye problems.



Merely by installing Fluorescent Light Blind on fluorescent lights, reflection on CRT displays is cut effectively.

New! Sound Barrier for Dot Printers

The annoying noise made by dot printers can reduce office operating efficiency and even cause stress. Again, JAPEX offers a low-cost answer to a common office problem, with economical, high-quality sound barriers for every type of printer. As an example, sound reductions of 15-20 phons are possible with 15-inch dot printers.

Eye-Guard Protects Eyes from Harmful Effects of CRTs and TV Monitors

At work and at play, computer terminals are used at close range, exposing the operators to harmful emissions, eye fatigue and stress. Eye-Guard solves all these problems. Its polarized film/filter structure completely blocks ultraviolet rays, reduces infrared rays by more than half, makes characters easier to read, reduces reflections, and eliminates flickering.

For information on becoming a distributor of these timely products for the Office Automation Age, contact JAPEX Corporation.

JAPEX CORP.

Corporate micros do not replace information centers



MICRO BITS
David B. Phillips

A number of corporations sat back, watched and waited while other companies installed information centers. Many were skeptical about the concept actually working. Others were afraid of creating another MIS subempire. And others were put off because of the cost.

Now, many of those corporations' executives who hesitated and waited it out are patting themselves on the back. They are convinced that by having avoided installing an information center during the past six years of its boom period, they took a calculated risk that paid off and saved their companies millions of dollars. They believe that personal computers have made the information center obsolete.

The words "personal computers" immediately conjure up images of all sorts of corporate personnel — from clerks to chief executive officers — sitting at their desks busily using personal computers to improve their productivity dramatically (50%?, 100%?, 200%?) while drastically cutting their computing costs (50%?, 75%?, 99.95%?) with software so user-friendly that it almost runs by itself.

To many seasoned personal computer users, the images sound futuristic (to the optimists) or fantastic (to the realists). Either way, they know that it just is not so. Not now and maybe never. But talk to your non-personal-computer-user managers, whether they are from MIS or a user department, and you will find that the aforementioned images are their view of current, state-of-the-art micro operations.

Additionally, while information centers provide computing alternatives far more cheaply than traditional system development, they have proven to be expensive nonetheless.

The information center requires a competent and well-trained staff plus aggressive, creative and well organized management. These do not come cheaply in today's personnel market. And while a mediocre programmer with personality problems can get lost in a traditional system development project, an information center consultant who cannot relate well to users turns off users and can kill the business.

If you believe the images conjured up about the state of the art for personal computer usage, you'd have to conclude that information centers should not be installed because they are expensive, completely unnecessary and obsolete.

The problem is not just that these images are wrong. There is a greater problem in not recognizing that the services that the information center was originally supposed to provide for mainframe users (before personal computers came along) are the same services personal computer users need today.

Information centers were set up to do the following:

- Test and evaluate end-user software.
- Recommend and install a stable of packages.
- Consult with users on the best package for a particular business application.
- Facilitate user access to the computer (that is, get them identification and so forth).
- Provide education and training on the end-user software.
- Provide miscellaneous follow-up services, such as handholding, user newsletters, advanced seminars and hot lines.

There are far too many software packages out there for the non-DP end user to make intelligent decisions about alone. If the question used to be Visicorp's Visi Calc or Sorcim Corp.'s Supercalc, it's now Lotus Development Corp.'s 1-2-3 or Symphony or Ashton-Tate's Framework. And if users are fairly sure what software they want, the multitudes of printers, peripherals and boards will drive them crazy.

Corporate standards for hardware and software packages, while often seeming unnecessary to companies buying their first 100 microcomputers, tend to become essential down the road. Even if local-area networks are not in the company's future plans, data sharing between users becomes difficult or impossible when different spreadsheet packages are employed.

Some corporations that have held back on creating a formal information center support unit for microcomputer users, while installing hundreds of personal computers, are courting disaster. The problem is multifaceted: MIS management that is looking to cut corners on expenses, MIS and user executives who are unrealistic about the support needs of personal computer users and users who are naive about the pitfalls of "blind hikes in the woods" or are too docile about demanding the help they need.

David B. Phillips is a project manager with the pensions department of a large insurance agency.

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MONDAY AFTERNOON, JAN. 28, 1985.



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Computone offers turnkey

ATLANTA — Computone Systems, Inc. has announced Atvantage, a series of turnkey systems that allow the IBM Personal Computer AT to act as a multiuser system running Computone's CS-DOS operating system.

The systems consist of an intelligent terminal controller, terminals, the CS-DOS operating system and vertical market software.

The Atvantage terminal controller reportedly handles up to eight terminals, which can be Personal Computers or a variety of CRTs, including Digital Equipment Corp.'s VT100 and Lear Siegler, Inc.'s ADM 3A.

The product reportedly provides full support of up to five background jobs.

Atvantage is said to include a full set of utilities that allows files created by IBM's PC-DOS or Microsoft Corp.'s Xenix operating systems to be stored on the same disk as CS-DOS files.

Computone reports that CS-DOS has a number of vertical applications written for it, including medical office, accounting, wholesale distributor, insurance agency and petroleum distributor packages.

Prices for the systems range from $16,000 to $22,000, according to Computone.

Computone Systems is located at One Dunwoody Park, Atlanta, Ga. 30338.

Citicorp access tools debut

NEW YORK — Citicorp Information Services has announced two data access programs designed for IBM Personal Computers.

Citiquote Investor is said to enable users to perform the basic tasks of portfolio evaluation and analysis. Information updated daily on some 61,000 stocks, bonds and options is available from Citiquote, Citicorp's securities data base. Citiquote Investor reportedly can screen securities to meet a customized investment criterion. The program generates pricing histories, position reports and dividend and interest performance histories, the vendor said.

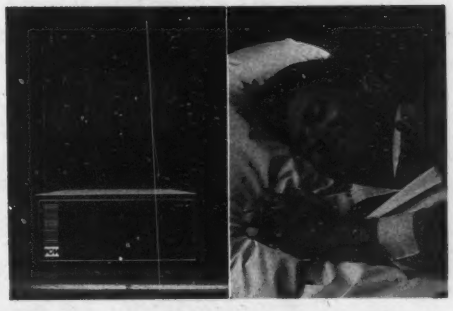
Citiquote Investor is available for the IBM Personal Computer or Personal Computer XT, with a minimum of 128K bytes of memory required. The package also requires two floppy disk drives or one floppy and one hard drive. Price is $395.

Citibase Connection enables users to connect an IBM Personal Computer or Personal Computer XT to Citibase, Citicorp's U.S. economic data base. Citibase Connection automatically dials a local telephone number, signs on to Citibase and requests data, which it then writes on a Personal Computer diskette. Price is $295.

An annual subscription rate of $2,250 is charged for both Citiquote Investor and Citibase Connection.

Citicorp is located at 399 Park Ave., New York, N.Y. 10043.

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The PCM is an inexpensive, easy to operate front-end processor for your personal computer or terminal. For more information please call us *toll-free 1-800-BetaCom*, operator 55. (Distributor inquiries invited.) The PCM 2000 from BetaCom, your single source for advanced data communications and text messaging.

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HP announces Dbase II version for 110 micro

PALO ALTO, Calif. — Hewlett-Packard Co. has announced a version of Ashton-Tate's Dbase II that runs on the 9-lb HP 110 Portable computer.

Dbase II reportedly allows the purchaser to construct and manipulate data files for sorting and report generation. It can be used for general ledger, accounts payable, sales tax records, payroll, check management, time billing, inventory control, job costing, tax computing and document cross-referencing applications, according to HP.

The software reportedly features an English-like programming language that enables users to write menus and programs for their specific applications.

Dbase II costs $500.

HP is located at 3000 Hanover St., Palo Alto, Calif. 94304.

Flashcalc out for IBM micro

SAN JOSE, Calif. — Visicorp has introduced a version of its Flashcalc spreadsheet program that runs on the IBM Personal Computer.

Designed as an entry-level package, Flashcalc features a set of financial functions including internal rate of return, net present value, present value, future value, payment, payment periods, interest rate and discount rate, Visicorp said.

The program also reportedly features variable column widths that allow users to set column dimensions as needed.

Flashcalc supports international decimal punctuation, currency symbols and pull-down menus, according to the vendor. The program is said to be compatible with existing Visi Calc templates and can incorporate files that conform to the Data Interchange Format.

Flashcalc costs $99.

Visicorp is located at 2895 Zanker Road, San Jose, Calif. 95134.

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The Dynamic Report System provides a bridge between on-line systems and the JES report queues. Move it all to JES and gain performance along with centralized report distribution. Let JES account for, archive and distribute reports to 327X printers, local printers, PCs, plotters, microfilm devices and 5210s.

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MICROCOMPUTERS

SOFTWARE

EVALUATION AND PLANNING SYSTEMS, INC.
Micro FCS

Evaluation and Planning Systems, Inc. has introduced its Micro FCS decision support system for the Hewlett-Packard Co. HP 150.

Micro FCS reportedly was designed for business planners without data processing backgrounds to conduct budgeting, operations analysis, forecasting, modeling and cash management operations. The package is said to be syntax-compatible with the vendor's mainframe decision support system, FCS-EPS.

Features of Micro FCS reportedly include user-defined functions and commands, more than 50 precoded functions, user-programmable function keys, a report writer, full screen data entry and menu building. Also said to be included are screen formatting, aggregation, an on-line editor and on-line Help.

Micro FCS is priced at $2,000.

Evaluation and Planning Systems, One Industrial Way, Windham, N.H. 03087.

ACCUCOM DATA NETWORK, INC.
Usr Tools

Accucom Data Network, Inc. has announced a typesetting preview program based on AT&T's Unix that allows the user to see formatted text in its final typeset form before output to typesetting/printing facilities. The Usr Tools package is an enhanced version of AT&T's Documentor's Workbench for microcomputers, according to the vendor.

The package reportedly allows the formatted text file to be output to an on-site dot matrix printer in exactly the same form that it will appear after typesetting or printing. Typesetting errors can be located and corrected from the Usr Tool printed copy, the vendor said.

Usr Tools is available for IBM's Personal Computer XT and compatibles under both Mark Williams Corp.'s Coherent and Microsoft Corp.'s Xenix operating systems.

Price of Usr Tools is $995, the vendor said.

Accucom Data Network, Suite 220, 9730 Cascade Blvd., Tigard, Ore. 97223.

FOXHALL COMMUNICATIONS
PC Privacy

Foxhall Communications has announced PC Privacy, a security system for the IBM Personal Computer and many computers that run Digital Research, Inc.'s CP/M 80 operating system.

PC Privacy encrypts data files. As it encrypts the file, the buyer identifies the file to be encrypted, the desired name of the file and a password to the file, Foxhall said. The product makes an encrypted version of the file and leaves the original file, which the user can erase, according to the vendor.

Before Oct. 31, PC Privacy costs $95. Thereafter, it will cost $140.

Foxhall Communications, P.O. Box 6669, Silver Springs, Md. 20906.

VANTAGE POINT SYSTEMS, INC.
SOS

Vantage Point Systems, Inc. has announced Sales Organization Software (SOS), a manufacturer's representative and independent sales organization package that runs on the IBM Personal Computer XT and Personal Computer AT.

SOS can help keep up-to-date account records, track sales leads and target direct-mail campaigns, according to the vendor. The product is said to feature a commission system that can model any business plan and automate commission tracking.

SOS software costs $3,500. A turnkey system that runs on the IBM Personal Computer XT with an IBM graphics printer sells for $8,854. An IBM Personal Computer AT turnkey system is priced at $9,879.

Vantage Point Systems, 14 Tally Ho Lane, Framingham, Mass. 01701.

See SOFTWARE page 104



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SOFTWARE from page 102

APPLIED SOFTWARE TECHNOLOGY CO.
Versaform XL enhancements

Applied Software Technology Co. has announced enhancements to its Versaform data base management program, which runs on the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatible systems.

Versaform XL now has multifile capabilities, allowing users to call up information from one Versaform file while working on another, according to Applied Software. Procedures or small programs can be written to extend the program's menu-selected functions, the vendor said.

Also available for use with Versaform XL is a series of application templates containing predesigned data entry screens. The templates include legal office manager, purchase order, invoicing, mailing list, medical patient bill, cash receipts journal, expense journal/distribution, job cost, checkwriter and medical insurance claims. Prices for the templates begin at $39.95.

Versaform XL requires 192K bytes of random-access memory, two double-sided disk drives and IBM DOS 2.0 or higher.

Price is $449.

Applied Software Technology, 170 Knowles Drive, Los Gatos, Calif. 95030.

SOFTWARE STUDIOS, INC.
Nifty

Software Studios, Inc. has introduced an address and phone file package for use on the IBM Personal Computer and compatibles under IBM's PC-DOS operating system.

Nifty features letter-writing capability, an appointment/reminder calendar, a memo pad, a full-featured printing calculator and an automatic phone dialer, Software Studios said. Addresses reportedly can be printed directly onto envelopes, or labels may be printed.

The software requires 64K bytes of memory and a printer. A modem and telephone are required for the autodial feature.

Nifty is priced at $75.

Software Studios, 8516 Sugarbush Court, Annandale, Va. 22003.

UNICORN SYSTEMS CO.
Micro CICS

Unicorn Systems Co. has announced Micro CICS, a menu-driven program development tool that runs on the IBM Personal Computer XT/370.

The product reportedly allows a programmer to enter, compile, test and debug IBM CICS programs before sending them to a mainframe, according to the vendor. Micro CICS is said to allow entry, editing and compiling of command-level CICS source code programs.

Micro CICS reportedly features online screen generation and automatic creation of basic mapping support maps and host communications.

Test data may be defined by using the Micro CICS' test data generation utility.

Micro CICS costs $4,495, the vendor said.

Unicorn Systems, 3807 Wilshire Blvd., Los Angeles, Calif. 90010.

UNIPRESS SOFTWARE, INC.
PS-Make

Unipress Software, Inc. has announced PS-Make, which adds an AT&T Unix-like Make facility to Microsoft Corp.'s MS-DOS operating system.

The utility allows a user to modify components of a system, and it automatically executes only those commands necessary to rebuild the system, according to Unipress Software. Because the product checks the modification time of each component and decides which modules must be processed, there is no need to execute long batch files to recompile a program, Unipress said.

PS-Make costs $129. A package including Unipress's Emacs programmable editing system, Lattice C native compiler and Phact Isam file system sells for $1,099.

Unipress Software, Suite 312, 2025 Lincoln Highway, Edison, N.J. 08817.

MATH STRATEGIES
Dextos

Math Strategies has announced Dextos, a product that exports files created on a Wang Laboratories, Inc. VS series minicomputer so they can be manipulated on a Wang Professional Computer with Lotus Development Corp.'s 1-2-3.

Dextos consists of three components: a VS query program, a Professional Computer batch procedure and an Auto 1-2-3 work sheet. The VS query program reportedly is menu-driven and allows field and record selection. The batch program is said to handle data transfer from the minicomputer to the microcomputer. The Auto 1-2-3 facility includes formatting macros that draw on parameters passed through from the VS control file, Math Strategies said.

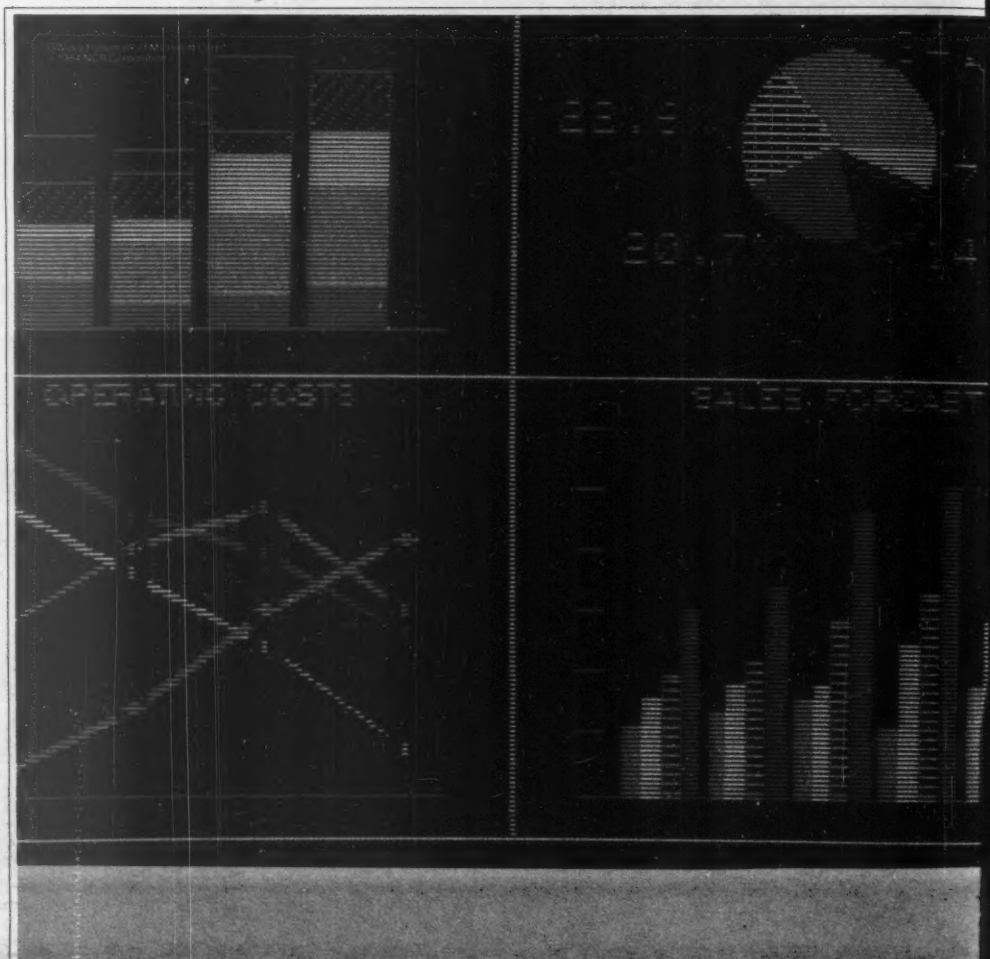
Dextos has a site license fee of $2,000 and a yearly maintenance fee of $120.

Math Strategies, 604 Green Valley Road, Greensboro, N.C. 27408.

WESTMINISTER SOFTWARE, INC.
Pertplotter

Westminister Software, Inc. has introduced an add-on software program that is said to bring network logic plotting capabilities to the vendor's Pertmaster project management program.

Pertplotter can run logic network plots with multiple color and line-



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MICROCOMPUTERS

style options that allow the user to detail and illustrate important areas of a project, the vendor said. The program can run on various plotters and printers made by IBM, Epson America, Inc. and Hewlett-Packard Co.

Pertplotter will be available Oct. 1 for $495.

Westminister Software, Suite 2, 660 Hansen Way, Palo Alto, Calif. 94304.

VIA COMPUTER, INC.
Microprophit 3.01

Via Computer, Inc. has enhanced its Microprophit software system for corporate financial planning, adding directory maintenance and a custom report writer for report layout and replacing numeric operating codes with English line instructions.

Microprophit Version 3.01 runs on IBM's PC-DOS operating system for the IBM Personal Computer and compatible machines.

According to the company, directory maintenance gives users access to existing models, reports and data files. The Custom Report Writer allows the user to change the layout of the report, for example, adding headings, data columns or footnotes where desired.

The company also added the capability to reference data from a Data Interchange Format to Microprophit.

Microprophit's layered menu has been changed to display 21 commands simultaneously, the company said.

Microprophit's existing planning capabilities include modeling functions such as depreciation, loan amortization, simultaneous equations and currency conversions, consolidation functions and analytical functions such as base-period ratios and period-to-period changes.

The Microprophit Version 3.01 sells for $695.

Via Computer, 7177 Construction Court, San Diego, Calif. 92121.

AUTOMATED INSURANCE RESOURCE SYSTEMS, INC.
Airwaves

Automated Insurance Resource Systems, Inc. has announced Airwaves, an insurance company forms management and communications system that runs on the IBM Personal Computer.

Airwaves reportedly allows a user to define a form and link up to 100 screens in a form. Airwave forms can accommodate eight pages of free-form text, according to the vendor. The package's Fasttrack function is said to ensure completion of information transfers automatically. The product reportedly features security procedures, a variety of printouts and automatic dialing for information requests.

Airwaves is available at an annual license fee of $1,200 per Personal Computer.

Automated Insurance Resource Systems, 1250 E. Diehl Road, Naperville, Ill. 60540.

BMDP STATISTICAL SOFTWARE, INC.
Statistical programs

BMDP Statistical Software, Inc. has announced 21 statistical programs developed for mainframes that are now available for the IBM Personal Computer.

The software is intended for use by financial analysts, market researchers, quality control staff, research and development professionals and economists. The programs are said to feature linear and nonlinear regression; log-linear modeling; analysis of variance; and time series, multivariate, nonparametric, cluster and survival analyses.

Minimum requirements for running BMDP software include a 5M-byte hard disk, a capacity to read double-sided, double-density floppy disks, an Intel Corp. 8087 floating point processor, IBM's PC-DOS 2.0 or later operating system and 640K bytes of memory, the company said.

The price for six programs is $450, and additional programs cost $50 each.

BMDP Statistical Software, Suite 202, 1964 Westwood Blvd., Los Angeles, Calif. 90025.

SOUTHWEST DATA SYSTEMS, INC.
Pluto Basic

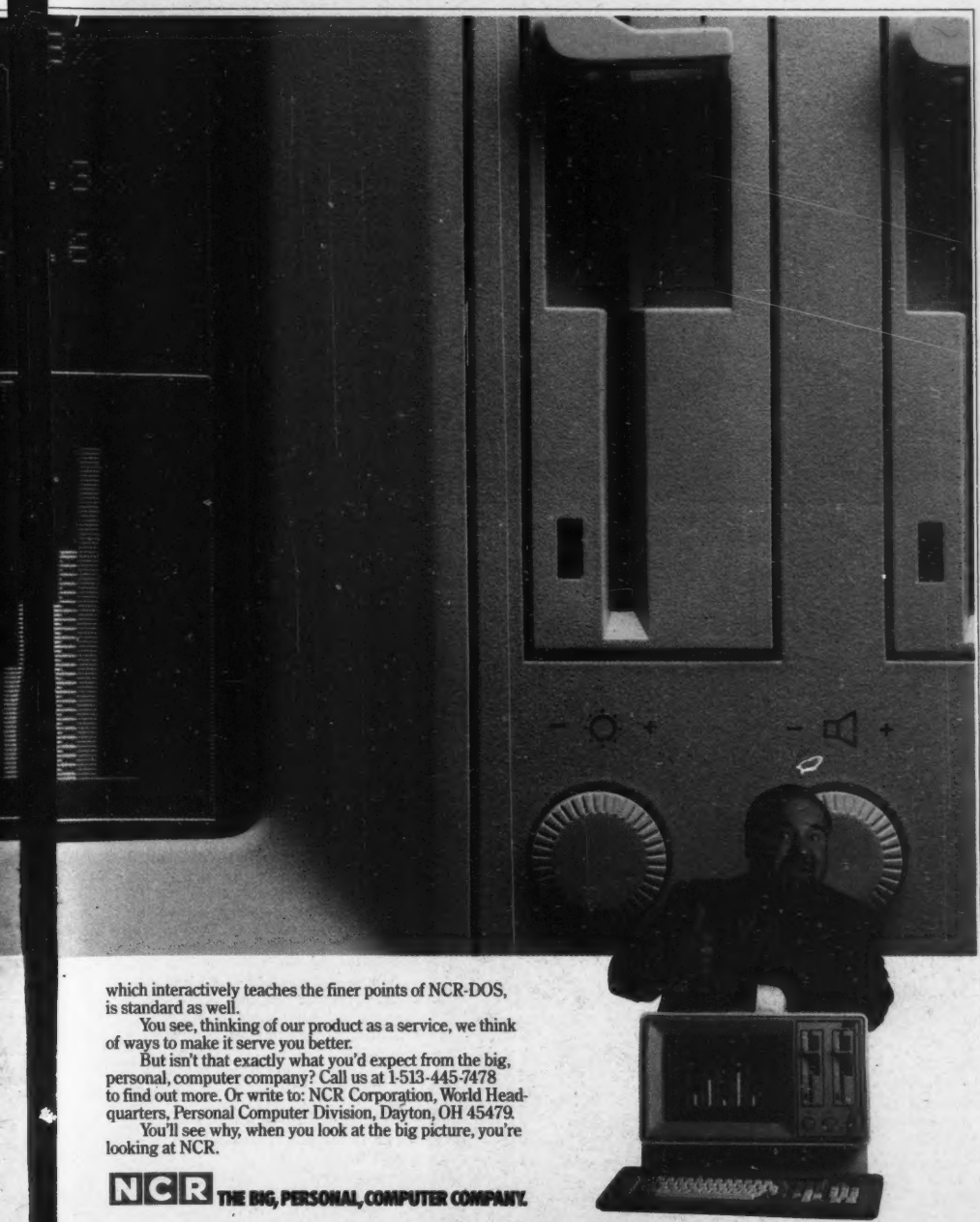
Southwest Data Systems, Inc. has announced Pluto Basic, which provides a Basic environment and interpreter that operates with Digital Research, Inc.'s CP/M or Microsoft Corp.'s MS-DOS operating systems.

Pluto Basic reportedly features multiple-user capability, large file handling capability and software portability.

Pluto Basic is said to perform five functions: translating Basic program statements and commands into a specific set of requests, compiling program statements, maintaining the user program area, listing functions in Basic and maintaining the user data area.

Pluto Basic costs $495, the vendor said.

Southwest Data Systems, 3017 San Fernando Blvd., Burbank, Calif. 91504.



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MICROCOMPUTERS

SYSTEMS

ONYX SYSTEMS, INC.
C5010V

Onyx Systems, Inc. has introduced an 8-bit microcomputer, the C5010V, using the Oasis operating system.

The C5010V incorporates the Zilog, Inc. Z80B microprocessor and reportedly features five serial ports, one parallel Centronics-type port, 384K bytes of random-access memory and a choice of 14M, 21M, 40M or 80M bytes of internal Winchester disk storage with magnetic tape backup.

The unit's software allows main memory to function as a logical disk for frequently accessed data, Onyx said. The system's disk cache facility reportedly provides the same function and updates the physical disk.

The C5010V's processor operates at 6 MHz, according to the vendor. The unit is said to include bundled utilities for the dealer, user and software developer.

The C5010V is priced at $7,990.

Onyx Systems, 25 E. Trimble Road, San Jose, Calif. 95131.

AMBI CORP.
Ambiterminal

Ambi Corp. has unveiled Ambiterminal, an integrated voice and data terminal that can expand to offer personal computing features.

Ambiterminal provides a telephone handset and speakerphone, two phone lines for voice or data transmission, an electronic directory capable of storing up to 2,000 entries, a five-function calculator, full-stroke keyboard, numeric keypad and power supply, according to Ambi.

The system reportedly includes 32K bytes of random-access memory which can be expanded to 128K bytes, a 300 bit/sec modem, an Intel Corp. 8088 microprocessor and 8K bytes of Cmos memory, which can be increased to 64K bytes.

Ambiterminal costs $1,195.

Ambi, 1033 Washington Blvd., Stamford, Conn. 06901.

DOCUTEL/OLIVETTI CORP.
Price cuts

Docutel/Olivetti Corp. has announced price cuts and increased standard memory for its personal computer line.

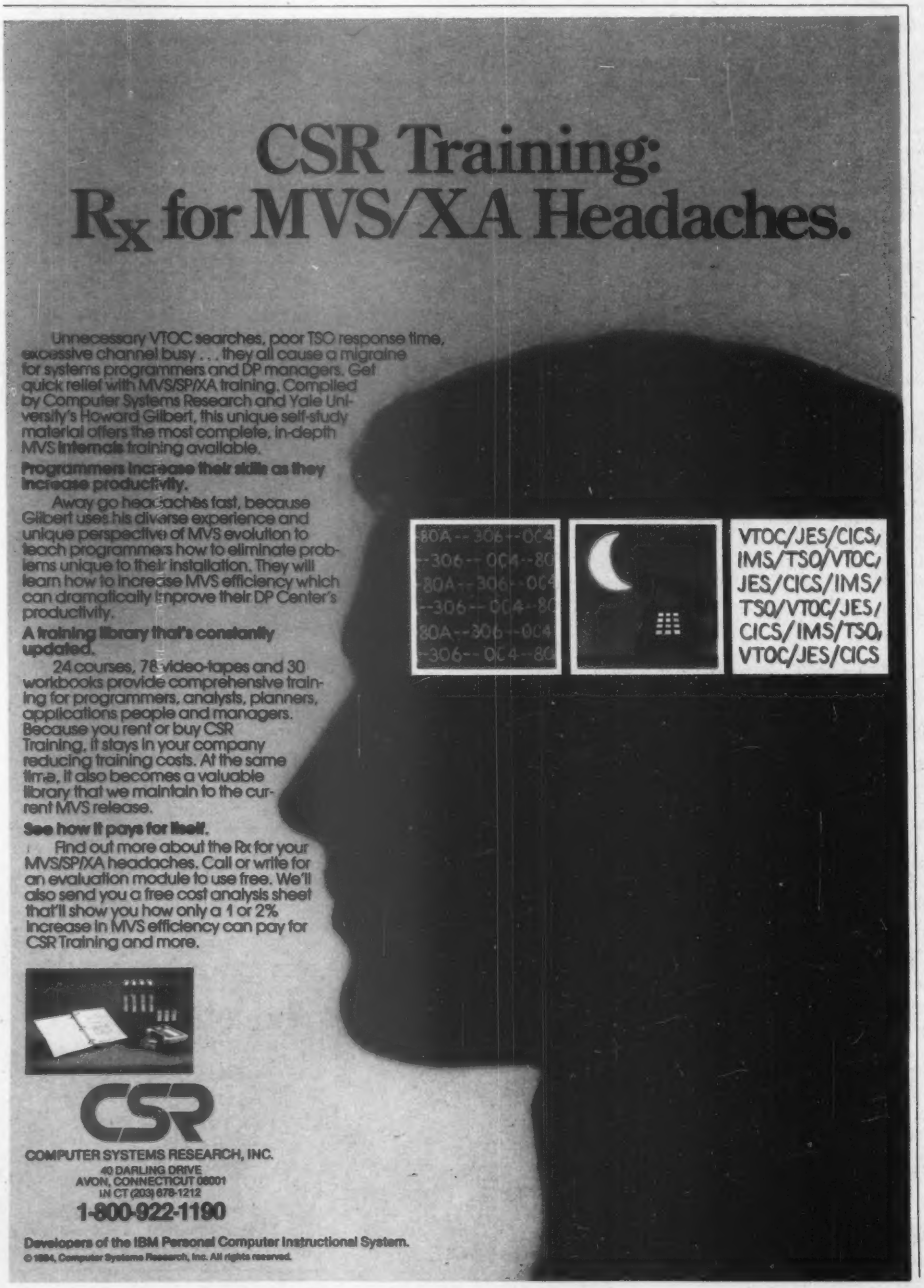
Olivetti's PC DT-1 desktop system or P-1 portable microcomputer, equipped with a detachable keyboard, 12-in. display, 128K bytes of random-access memory (RAM), a 320K-byte floppy disk drive and eight Micropro International Corp. software packages, cost $2,695, a $200 price cut. Memory expansion kits that add 128K bytes of RAM now cost $195, down from $295.

Olivetti's PC DT-2 or P-2 with the same features as the PC DT-1 and P-1, except for standard dual drives and 256K-byte RAM, now cost $3,095, a $200 cut.

The price for the company's PC DT/HD, which replaces one PC DT-2 floppy drive with a 10M-byte hard disk, has been cut by $400 to $4,095.

Users can purchase the products without Micropro's software and save $500.

Docutel/Olivetti, 5615 Highpoint Drive, Irving, Texas 75038.



COMMUNICATIONS

PACER SOFTWARE, INC.
PClink

Pacer Software, Inc. has introduced a microcomputer interconnect package that is designed to link Prime Computer, Inc. 50 series minicomputers to IBM Personal Computers and compatible machines.

PClink is said to offer Ascii and binary bidirectional file transfer between the IBM Personal Computer and Prime computers. Both high-speed and error recovery modes exist, according to Pacer.

The software operates over directly connected or dial-up lines to the Prime host, the vendor said. It is also said to feature access to Prime's spool subsystem from simple Personal Computer-based menus. The Prime and Personal Computer software is written in AT&T's Unix operating system-compatible C language for porting to other environments, the vendor said.

The host side of PClink is licensed, while the Personal Computer side is not. Prices range from $2,000 for a host with five Personal Computers connnected to $15,000 to a host with 256 connections.

Pacer Software, 1227 Pearl St., La Jolla, Calif. 92037.

PRO LOG CORP.
Lynx 1

Pro Log Corp. has announced Lynx 1, which links any personal computer to a standard bus via RS-232C serial communications.

Lynx 1 reportedly features Pro Log's 7806 multifunction card, which includes a Zilog, Inc. Z80A microprocessor, dual universal asynchronous receiver-transmitters (UART), 2K bytes of communications management software and 2K bytes of random-access memory. Lynx 1's communications management software includes a system utilization module, data transfer manager, asychronous manager, I/O port, memory and UART drivers, according to Pro Log.

The vendor said that Lynx 1 commands can be used to communicate I/O instructions or programs with selectable functions, such as Load Data, Send Data, Read I/O Port, Write to I/O Port, Read Memory and Write to Memory.

Lynx 1 costs $695, according to Pro Log.

Pro Log, 2411 Garden Road, Monterey, Calif. 93940.

MICROCOMPUTERS

AST RESEARCH, INC.
PCnet; PCnet II Version 3.0

AST Research, Inc. has announced enhancement of its PCnet and PCnet II local-area network software for the IBM Personal Computer. Under PCnet, as many as 223 Personal Computers can be linked using up to 5,000 ft of coaxial cable.

The enhanced version, Version 3.0, reportedly provides improved response time and offers a print spooler permitting several users to access the same printer simultaneously. Version 3.0 also requires the assignment of only one interrupt line, not the two required by earlier software, according to the vendor.

Version 3.0 of PCnet and PCnet II are priced at $495.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

STORAGE

QUADRAM CORP.
Quaddisk

Quadram Corp. has announced Quaddisk, a 12M-byte half-height hard disk drive designed for the IBM Personal Computer.

The half-height hard disk drive reportedly allows the buyer to utilize available internal space fully by requiring only one expansion slot. This feature allows the user to install a half-height floppy disk drive as well, according to Quadram.

The product is said to include Wonder, a menu-driven utility file that allows a user to work with IBM's PC-DOS operating system commands.

Quaddisk comes with documentation, controller card, power supply and software.

The product costs $2,250.

Quadram, 4355 International Blvd., Norcross, Ga. 30093.

SYSTEMS PERIPHERALS CONSULTANTS
Ultrastore

Systems Peripherals Consultants has announced 70M-byte and 140M-byte (unformatted) disk drives for the IBM Personal Computer and compatibles, including the IBM PCjr and Sanyo Business Systems Corp. MBC 550 microcomputers.

The Ultrastore disk drives are said to have an average access time of 30 msec. They are recommended for use where large data base or shared resource network applications are required.

Prices for the 70M-byte and 140M-byte drives are $4,995 and $6,795, respectively.

Systems Peripherals Consultants, 9747 Business Park Ave., San Diego, Calif. 92131.

UPLAND TECHNOLOGIES, INC.
Silo UT9000

Upland Technologies, Inc. has announced the Silo UT9000, a ¼-in. cartridge tape subsystem said to offer a 67M-byte memory capacity and compatibility with ½-in., 9-track tape drive hardware and software.

A start-stop mode and a speed of up to 2M byte/min in a streaming mode are supported, the company said. The UT9000 uses ½-in. tape host adapters, can be daisy-chained along with a ½-in. formatted tape drive and will support a slave Silo drive, the company said. Most major minicomputers are supported as well as the IBM Personal Computer, Personal Computer XT and compatible machines, the company said.

Data reliability is offered via 3M Co.'s DC600HC data cartridge, said to allow real-time error correction and redundant data recovery. The subsystem is self-powered in a cabinet 5-in. high, 9-in. wide and 15-in. deep.

The price of the UT9000 is $2,990, the vendor said.

Upland Technologies, 80 Davids Drive, Hauppauge, N.Y. 11788.

ALLOY COMPUTER PRODUCTS, INC.
PC QIC-Stor

Alloy Computer Products, Inc. has introduced a personal computer subsystem that integrates a high-capacity hard disk drive with a streaming cartridge tape backup unit.

The hard disk of the PC QIC-Stor stores from 20M bytes to 170M bytes of information, Alloy said. The integrated tape drive reportedly includes file-oriented capacity of more than 40M bytes on a single tape cartridge. The ¼-in. tape drive backs up the system's hard disk at 2M byte/min., according to the vendor.

PC Qic-Stor operates under IBM's PC-DOS and Microsoft Corp.'s MS-DOS and can support the IBM Personal Computer, the Personal Computer XT, the Personal Computer AT, Compaq Computer Corp.'s Compaq and other IBM-compatible systems.

The product sells for $6,295 in a 52M-byte disk configuration.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

PRINTERS/PLOTTERS

EPSON AMERICA, INC.
Plotter

Epson America, Inc. has announced a four-pen plotter that works with the IBM Personal Computer, Epson's QX-10 and Apple Computer, Inc.'s Apple IIc and Apple IIe microcomputers.

The plotter reportedly features 42 intelligent commands that reduce programming time required to produce pie charts, bar graphs, line graphs, circles, arrows and arcs, according to Epson.

The plotter costs $599.

Epson America, 3425 Kashiwa St., Torrance, Calif. 90505.

TANDBERG DATA, INC.
Model TDP 8800 printer

Tandberg Data, Inc. has announced a matrix printer with bidirectional print speed of 150 char./sec. The Model TDP 8800 prints 100 line/min based on a 60-char. line with 10

Continued on page 108

Integrating Professional Computers into Office Systems?
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Manager, Rainbow Group

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Continued from page 107

char./in., according to the vendor.

Eight character sets can be generated, and the printer has a 165-char. data buffer, expanded print, programmable pitch (5 to 17 char./in.), proportional spacing and horizontal and vertical tabulation, Tandberg said. The paper feed system will accept fanfold, roll and single sheets, the vendor said.

Price of the TDP 8800 is $895.

Tandberg Data, P.O. Box 99, Labriola Court, Armonk, N.Y. 10504.

MICRODATA CORP.
Dot matrix printer; pen plotter

Microdata Corp. has introduced a dot matrix printer and a pen plotter for its M1000 relational workstation.

The printer reportedly operates at 160 char./sec and supports a maximum of 136 char./line. The printer also is said to provide bidirectional printing in text mode and to support 32 different size/pitch combinations. It is priced at $825. The six-pen plotter reportedly can utilize pens of different widths and selects pens from its rotating carousel. It is priced at $1,895.

Microdata, 17481 Red Hill Ave., Irvine, Calif. 92714.

BOARD-LEVEL DEVICES

INFOTEK SYSTEMS
AM200

Infotek Systems has announced AM200, a 1M-byte memory board for Hewlett-Packard Co. HP 9000 series microcomputers.

AM200 can be used to replace 256K-byte memory cards on HP's Model 9816, 9826, 9836 and 9920 microcomputers, Infotek Systems said. The product reportedly fits into the seven expansion slots available on Models 9826, 9836 and 9920. Two AM200 boards can be added to the Model 9816, and peripherals can be used without requiring an I/O expander, according to the vendor.

AM200 costs $2,950.

Infotek Systems, 1400 N. Baxter St., Anaheim, Calif. 92806.

CSD, INC.
Ultra-Res Graphics controllers

CSD, Inc. has announced two controllers in its family of Ultra-Res Graphics, the Models 4-79 and 4-111, which provide high-resolution, high-performance graphics for the IBM Personal Computer and compatible microcomputers.

Both models provide programmable display resolution to 1,024 by 1,024 pixels, interlaced, from a memory of either one million or four million pixels, the company said. Based on the NEC Information Systems, Inc. 7220, the controllers feature light pen input, hardware vector, arc drawing at rates up to one million pixel/sec, rectangle drawing, zoom from 2 to 16 times the size of the original, windowing, scrolling and panning, the company said.

The controllers occupy a single slot in the host, and software drivers in Fortran are provided, the company said.

The price of the 4-79 is $995, and the 4-111 costs $2,000.

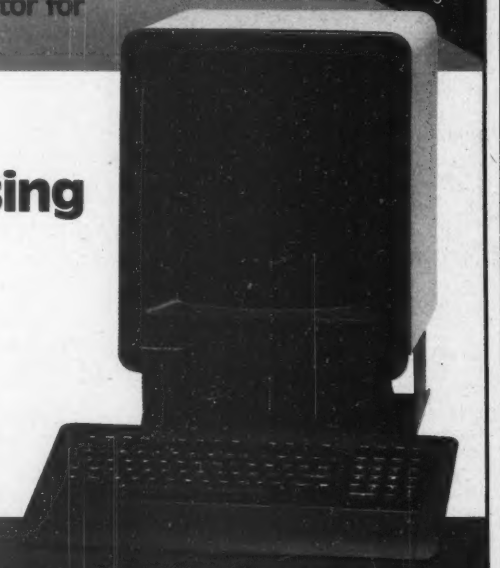
CSD, P.O. Box 253, Sudbury, Mass. 01776.

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Ergo 4000 is the ASCII Terminal featuring 80-column by 66-line format for complete full-page display capability. Features include: 15-down loadable function keys, four video attributes, pass-through printer port, screen saver, alternate character generator, settable tabs, 24-line display ability, and user-definable custom mode. Compatible with VT100* codes.

Popular word processing packages already modified to run on the Ergo 4000 include the following:

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*VT100 is a registered trademark of Digital Equipment Corporation.

STB SYSTEMS, INC.
Super I/O II; Quarter Byte

STB Systems, Inc. has announced Super I/O II and Quarter Byte, short-slot, add-on boards that run on the IBM Personal Computer.

Super I/O II is a four-function board that features an asychronous RS-232C serial communications port, a parallel port, game port and clock/calender, according to STB Systems. The serial port reportedly is compatible with the IBM asynchronous communications adapter and provides a switchable address for IBM Personal Computer-compatible microcomputers.

Quarter Byte is a random-access memory expansion board, available in two models: a 64K-byte model that expands to 256K bytes, and a 256K-byte model that can expand to 512K bytes, according to the vendor.

Super I/O II costs $229. A 64K Quarter Byte costs $259, while a 256K-byte model is priced at $519. Both products come with Resicorp's PC Accelerator, a software utility that features a print buffer.

STB Systems, Suite 125, 601 N. Glenville Drive, Richardson, Texas 75081.

INNOVATIVE ELECTRONICS, INC.
PC-80

Innovative Electronics, Inc. has introduced PC-80, a plug-in expansion board that links the IBM Personal Computer or Personal Computer XT with an IBM mainframe.

PC-80 reportedly uses a standard Type A coaxial connection to link the Personal Computer with an IBM 3274/3276 cluster controller or an IBM 4331 Display/Printer adapter.

It supports Binary Synchronous Communications as well as Systems Network Architecture/Synchronous Data Link Control communications protocols.

PC-80 also is said to enable the Personal Computer to appear to the cluster controller as an IBM 3278 Model 2, 3 or 4 monochrome display station.

Personal Computer XTs with a color screen reportedly can emulate IBM 3279 Models 2A, 2B, 3A, or 3B. Full IBM 3278/3279 keyboard support is said to be provided, including programmable function keys and IBM display station keyboard commands.

PC-80 is priced at $895, the vendor said.

Innovative Electronics, 4714 N.W. 165 St., Miami, Fla. 33014.

MICROCOMPUTERS

HASH TECH CO.
Multi-Font

Hash Tech Co. has announced the Multi-Font add-in card, said to enable the IBM Personal Computer or IBM Personal Computer XT to display any of 256 user-definable symbols, including foreign language characters and scientific symbols.

The Multi-Font card is intended to work with the IBM monochrome printer adapter and comes with software instructions.

Programmers do not have to change the read-only memory character generator with Multi-Font, and the program also allows the design of logos and labels, the company said.

The price of Multi-Font is $350, the vendor said. A manual and 15 font files including APL are included.

Hash Tech, Suite 103, 2065 Martin Ave., Santa Clara, Calif. 95050.

AUXILIARY EQUIPMENT

TOUCHSTONE TECHNOLOGY, INC.
Touchstone 1

Touchstone Technology, Inc. has introduced Touchstone 1, a plug-compatible numeric keypad for the IBM Personal Computer and Personal Computer XT.

The 29-key product features dedicated cursor, space, backspace, home and enter control keys, plus a set of math keys that includes percent and bracket keys for compound math formulas, Touchstone said.

Touchstone 1 plugs into the keyboard outlet at the rear of the Personal Computer cabinet and allows either microcomputer or keypad input, according to Touchstone.

The device costs $169.95.

Touchstone Technology, P.O. Box 24954, 955 Buffalo Road, Rochester, N.Y. 14624.

PARA SYSTEMS, INC.
Minuteman 250

Para Systems, Inc. has introduced Minuteman 250, a 250W uninterruptible power supply designed for microcomputers.

Minuteman 250 automatically provides power during blackouts and brownouts and can function for 15 minutes, Para Systems said. The product reportedly features noise and surge suppression, automatic recharging of a self-contained Gel-cell battery and an alarm and lights for notification of ac and battery power status.

Minuteman 250 costs $435.

Para Systems, Suite 404, 11425 Mathis St., Dallas, Texas 75234.

DATACOPY CORP.
Model 800

Datacopy Corp. has introduced a hardware/software system, the Model 800 word image processing system, to provide vision capability for the IBM Personal Computer XT.

Using an electronic digitizing camera, the Model 800 is said to allow business users to integrate images and text within computer-generated documents.

The Model 800 system reportedly has applications in signature verification, pattern recognition, picture data and nonstandard text storage.

The Model 800 consists of the firm's Model 680 graphics scanner, its Model 110 image processing interface, a software package and all necessary cabling.

The Model 800 system is available for $9,945.

Datacopy, 1215 Terra Bella Ave., Mountain View, Calif. 94043.

ALBAR, INC.
Micropower PC

Albar, Inc. has introduced Micropower PC, a line of power line conditioners featuring voltage regulation, surge protection, spike protection, noise attentuation and brownout protection for microcomputers.

The product's core design divides performance into complex nonlinear loads and maintains complete isolation of input and output circuits, Albar said.

Micropower reportedly features a lighted on and off switch, three output receptacles and a 6-ft cord for installation.

A 150 VA Micropower PC costs $219; a 275 VA model sells for $289.

Albar, 19013 36th Ave. W., Lynnwood, Wash. 98036.

VISAGE, INC.
V:Link 1000

Visage, Inc. has announced V:Link 1000, an interactive video system that works with an IBM Personal Computer.

V:Link 1000 reportedly allows developers to create programs that pass control commands to video disk players and control images stored on video disks, Visage said. Product applications include interactive training systems, networked systems with a connnection to video data bases, and point-of-purchase displays, according to the vendor.

V:Link 1000, which works with a color monitor, video disk player and standard input devices, consists of a video disk controller and software.

The product costs $1,150.

Visage, 12 Michigan Drive, Natick, Mass. 01760.

SPEECH LTD.
Protalker

Speech Ltd. has introduced Protalker, which provides IBM Personal Computers and microcomputers using an S-100 bus with voice output facilities.

Protalker features data compression, reproduction of any voice or sound and random access of stored

Continued on page 110

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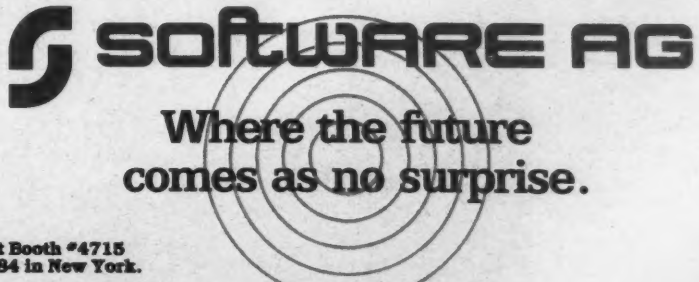
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CW0924

Continued from page 109

messages, according to the vendor.

Protalker reportedly allows the user to create and play voice files. Its source code is provided so that users can incorporate the product into any programming languages or applications, Speech said.

Protalker sells for $350.

Speech , Suite 213, 3790 El Camino Real, Palo Alto, Calif. 94306.

QUINTAR CORP.
Q1000; Q1080

Quintar Corp. has announced two versions of a stand-alone color graphics controller that enables the IBM Personal Computer, Apple Computer, Inc. Macintosh and others to interface with a high-resolution color monitor, large-screen video projector or slide-making device.

The Q1000 and Q1080 use an RS-232 interface to communicate with microcomputers and are aimed primarily at OEMs developing microcomputer-based workstations.

Standard Q1000 and Q1080 hardware features include both a 6 MHz CPU and a NEC Informations Systems, Inc. 7220 graphics display controller chip, up to 16K bytes of random-access memory for program, I/O or communications buffers, 256K bytes of display memory, up to 32K bytes of erasable programmable read-only memory for the full set of graphics commands, two RS-232C serial ports and one Centronics Data Computer Corp.-compatible 8-bit parallel interface.

The Q1000 with 512 by 512 pixels and 4 bits of programmable color information for each pixel is priced at $1,995, and the Q1080 with 832- by 630-pixel resolution costs $2,195.

Quintar, 2525 Maricopa St., Torrance, Calif. 90503.

THE VOICE CONNECTION
Introvoice III

The Voice Connection has announced Introvoice III, an intelligent voice entry and keyboard system for the IBM Personal Computer.

The product reportedly allows the user to enter data via voice or the keyboard. Introvoice III hears the user, understands commands and responds to them, Voice Connection said. The product is said to work with any word processing or spreadsheet program, including Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar.

The product's keyboard features a row of function keys and cursor and numeric keypads, Voice Connection said.

Introvoice III, which includes the keyboard and a microphone, costs $1,495.

The Voice Connection, Suite C, 17835 Skypark Circle, Irvine, Calif. 92714.

CURTIS MANUFACTURING, INC.
Diamond; Emerald; Sapphire; Ruby

Curtis Manufacturing, Inc. has announced a line of four microcomputer surge protectors: Diamond, Emerald, Sapphire and Ruby.

Diamond is a six-outlet wall plug that costs $49.95.

Emerald, a six-outlet wall plug, includes a 6-ft power cord and is priced at $59.95.

Sapphire, a three-outlet unit, sells for $79.95 and protects against surges caused by radios or stereos.

Ruby, which also protects against radio static, has six outlets, a 6-ft power cord and a price of $89.95.

Curtis Manufacturing, 305 Union St., Peterborough, N.H. 03458.

EFI CORP.
EDP-2000

EFI Corp. has introduced its EDP-2000 power control center and power conditioner for personal computers and peripherals.

The EDP-2000 reportedly provides protection from overvoltage transients and spikes and offers filtration equal to most isolation transformers. It also reportedly provides brownout protection and exceeds the Institute of Electrical and Electronics Engineers Category A and B suppression specifications.

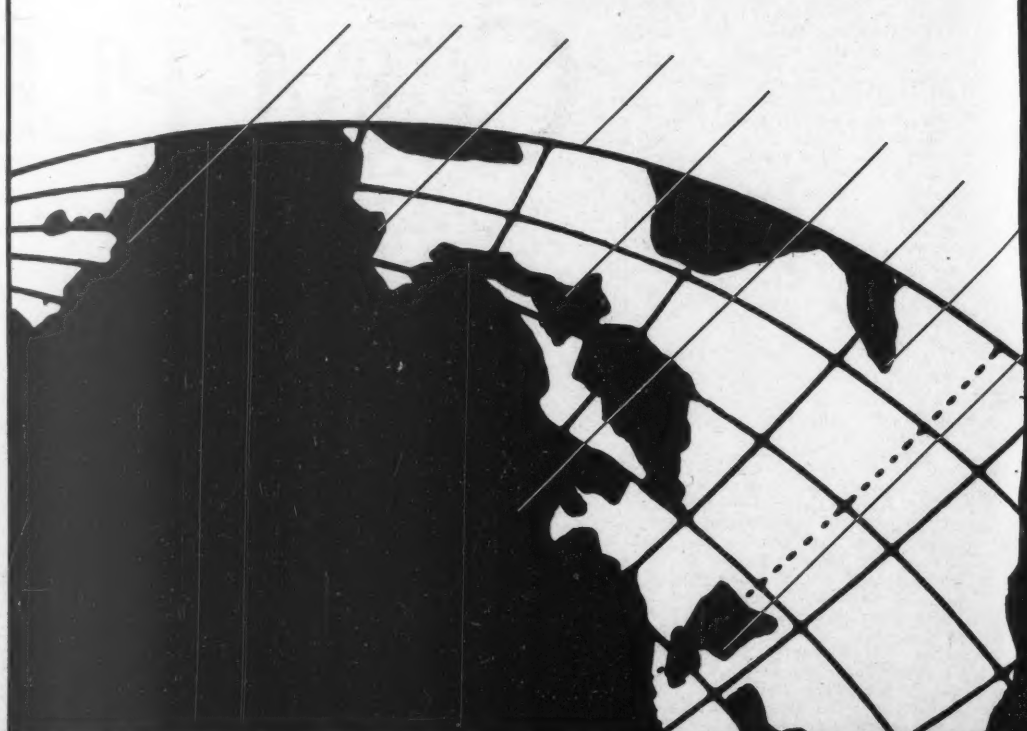
The EDP-2000 has a response time of less than 1 nsec and features six rear outlets, a working diskette storage file, a quartz clock and calendar, EFI said.

The EDP-2000 is priced at $169.50.

EFI , P. O. Box 15358, 350 W. 27000 South, Salt Lake City, Utah 84115.

See EXTRA page 112

You can advertise your product in over 40 computer publications in 25 foreign countries — with one phone call.



IBM from page 99

graphics abilities for general use, IBM added the $849 IBM Personal Computer Enhanced Color Display and a series of expansion cards. The IBM Personal Computer Enhanced Graphics Adapter, selling for $524, increases the number of colors available on the Personal Computer screen from four to 16 and the choice of shades from 16 to 64, according to IBM. The adapter also reportedly increases graphics resolution from 320 by 200 pixels in Personal Computer color graphics mode to 640 by 350 pixels.

Increasing the random-access memory (RAM) available for graphics applications, the $199 IBM Personal Computer Graphics Memory Expansion Card expands the Graphic Adapter's 64K bytes of RAM to 128K bytes, according to the vendor. The IBM Personal Computer Graphics Memory Module Kit, available for $259, is said to expand the Graphic Adapter's memory to 256K bytes of RAM.

Engineering/Scientific series

IBM also introduced a slew of products targeted toward engineers, scientists, researchers and developers. The IBM Personal Computer Engineering/Scientific series consists of a number of products:

■ Designed for computer-aided manufacturing, engineering and scientific applications, the $1,295 IBM Personal Computer Professional Graphics Display, a 13-in. monitor, and the $2,995 Professional Graphics Controller provide 640- by 480-pixel resolution.

■ The IBM Personal Computer Graphics Development Toolkit, offered for $350, reportedly includes a virtual device interface (VDI) and other programs to assist in the design of graphics applications that are independent of output devices such as displays, printers and plotters.

■ The IBM Personal Computer Graphical File System, priced at $175, is said to provide generation, storage and communications of two-dimensional graphics information regardless of the device or program used.

■ The IBM Personal Computer Graphical Kernal System, available for $295, consists of a subroutine of two-dimensional graphics primitives that are consistent with proposed American National Standards Institute (Ansi) and International Standards Organization standards.

■ The IBM Personal Computer Plotting System, a $225 subroutine library, is designed to assist in writing programs that produce various charts.

■ IBM Personal Computer Graphics Terminal Emulator ($295) provides the capability of emulating Tektronix, Inc.'s 4010 and 4100 and Lear Siegler, Inc.'s ADM3A protocols.

■ The $1,275 IBM Personal Computer Data Acquisition and Control Adapter reportedly transforms a Personal Computer into a scientific or industrial laboratory tool that controls processes, monitors transducers and automates electronic testing. The IBM Personal Computer Data Acquisition and Control Adapter Distribution Panel, a $245 option, provides access to input and output signals, voltages and grounds of the Control Adapter. The IBM Personal Computer Data Acquisition and Control Adapter Programming Support, which costs $160, is said to enable the user to control processes, automate electronic testing and monitor sensor-based systems.

■ The $395 IBM Personal Computer General Purpose Interface Bus Adapter and the $85 General Purpose Interface Adapter Programming Support package connect a Personal Computer to an IEEE-488 general-purpose interface bus.

■ IBM Personal Computer Professional Fortran, priced at $595, is a compiler that is said to offer full Ansi-77 functions with extensions.

IBM also added the IBM Personal Computer 256K-byte Memory Expansion Option, which sells for $489 and fits into the short slot of an IBM Personal Computer, Portable Personal Computer or Personal Computer AT.

The graphics products are designed for the IBM Personal Computer, Personal Computer XT and Personal Computer AT. All products are scheduled for October delivery, except for the Enhanced Color Display, which has a planned January 1985 shipping date.

IBM can be reached through P.O. Box 1328, Boca Raton, Fla. 33432.

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EXTRA from page 110

WHITNEY EDUCATIONAL SERVICES, INC.
Supercircuit-PC; Insight-PC

Whitney Educational Services, Inc. has introduced the Supercircuit-PC interface board and Insight-PC software package, which together allow IBM Personal Computer and Personal Computer XT users to develop interactive video programs on videotape or video disk.

The package reportedly allows transition from videotape to video disk and operates both types of systems. Lessons developed on tape can be pressed onto a video disk and run from the same system configuration, Whitney Educational Services said.

The package also reportedly features bar code reader capability and the ability to control several video sources simultaneously.

Supercircuit-PC, including interface card and connecting cables, is priced at $990. Insight-PC authoring software is priced at $990 as well.

Whitney Educational Services, Suite 416, 1777 Borel Place, San Mateo, Calif. 94402.

AUDOPILOT CO.
Audopilot-1000

Audopilot Co. recently announced a voice interface system that works with the IBM Personal Computer, the IBM Personal Computer XT and compatible machines.

According to the company, Audopilot-1000 interfaces with a range of software packages and mouses including Lotus Development Corp.'s 1-2-3, Visicorp's Visi Calc, Microsoft Corp.'s Multiplan and Software Publishing, Inc.'s PFS. The system reportedly allows the user to give oral commands to the computer, eliminating keyboard input.

The Audopilot-1000 has voice digitalizing capabilities with message storing on disk, the vendor said.

The product sells for $459.

Audopilot, P.O. Box 3006, Huntington Station, N. Y. 11746.

MICRO DISPLAY SYSTEMS, INC.
Genius VHR Model 401

Micro Display Systems, Inc. has introduced its Genius VHR monitor Model 401, a full-page monitor designed for the IBM Personal Computer.

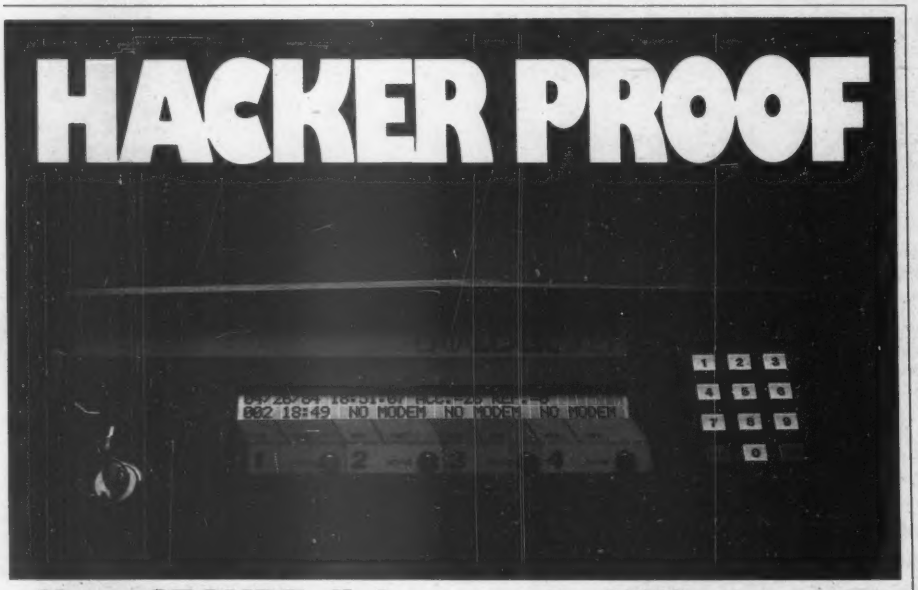
The Genius VHR reportedly includes both an adapter board and a full-page, high resolution monitor of 720 by 990 pixels. Its adapter card is said to be compatible with the IBM Personal Computer, able to support up to 144K bytes of display memory and a CRT controller and to offer a parallel printer port. An optional bit-mapped graphics daughter board is available.

The monitor's full-screen capability reportedly allows it to display 5,280 char. at once for use in word processing and other applications.

In its standard version, with monitor, adapter card and power and interface cables, the Genius VHR Model 401 is priced at $1,150, the vendor said. With its bit-mapped graphics board, the price is $1,495, according to the vendor.

Micro Display Systems, P.O. Box 455, Hastings, Minn. 55033.

See EXTRA page 114



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MicroFrame Inc.
205 Livingston Ave.
New Brunswick, NJ 08901
(201) 828-4499

APPLE from page 99

way."

The expanded memory removes a major stumbling block for the Macintosh, other analysts agreed, as many popular programs either ran with severe limitations in 128K bytes or did not fit within that space at all.

For example, Apple's Macwrite word processing application handles only 10 pages at a time in the 128K-byte version, but can work with up to 80-page documents in the 512K-byte version, the company noted.

Among prime examples of software that will require the 512K-model is Lotus Development Corp.'s Macintosh product, which is scheduled to be sold in first-quarter 1984 and represents a crucial offering for business users, observers said.

Noting widespread discounting of the Macintosh this summer, some analysts maintained that the September launch of the 512K model confirms that sales were beginning to slow. "Apple really needed to get the half-megabyte version out," said Chris Christiansen of the Yankee Group in Boston. "Sales were starting to plateau or drop."

Apple has acknowledged that the lack of business software has hindered Macintosh sales, but company President John Sculley emphasized that more than 40 packages are now available.

In addition to encouraging independent software vendors to write for the Macintosh, the Macintosh 512K represents an inexpensive development tool, Apple said.

Software written for the new machine reportedly also runs on the vendor's Lisa personal computers with hard disk support under Macworks, the Macintosh operating system for Lisas.

Starting in October, current Macintosh owners can expand their systems to 512K bytes at Apple dealers and service centers. The upgrade can be completed in less than 30 minutes, according to Apple. The company said it will provide a free copy of the Macproject and Macdraw applications to Macintosh customers who bought their systems before Sept. 10 and who buy an expansion kit by next March 31.

Both Macintosh versions include a system unit with built-in monitor, keyboard, mouse, operating system and two applications (Macwrite and Macpaint).

Apple is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

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EXTRA from page 112

MARYLAND COMPUTER SERVICES, INC.
Ready Reader

Maryland Computer Services, Inc. has introduced Ready Reader, an optical character reader that interacts with a microcomputer to read typewritten letters, memos and other documents to blind people.

The Ready Reader operates in conjuction with the vendor's Information Thru Speech (ITS) talking microcomputer, which translates the characters to speech, Maryland Computer said. The Ready Reader/ITS system reportedly also can produce braille with the use of a braille printer and can translate software.

Ready Reader is priced at $9,500.

Maryland Computer Services, 2010 Rock Spring Road, Forest Hill, Md. 21050.

MONCHIK-WEBER CORP.
Pricelink

Monchik-Weber Corp. has introduced the Pricelink market data delivery system for the IBM Personal Computer.

Pricelink reportedly allows users to accept the vendor's Ticker III ticker service and comes with an interface for Pascal programmers.

Pricelink is priced at $1,000 for the preprocessor board and software, not including communications and installation charges. Ticker III is priced at $500/mo for each Personal Computer, a rate that drops to $50/mo after four Personal Computers are attached.

Monchik-Weber, 11 Broadway, New York, N.Y. 10004.

COMPUTER SYSTEMS
PC Image/Graphix System

Computer Systems has announced PC Image/Graphix System, a document scanning and communications system for the IBM Personal Computer.

The high-resolution graphics and camera system features image scanning, processing, composition and communications facilities for microfilm, photographs, drawings, diagrams, three dimensional objects, printed text and financial or contractual diagrams.

It costs $5,000.

Computer Systems, 26401 Harper Ave., Saint Clair Shore, Mich. 48081.

SCIENCE/SCOPE

Troublesome electrical charges that build up on space vehicles will be overcome by an advanced charge-control system being developed by Hughes Aircraft Company for the U.S. Air Force. The Flight Model Discharge System will use a self-contained plasma source to effectively "ground" the spacecraft surface to the surrounding space plasma, eliminating disruptive arcing for charged surfaces. The system will monitor both vehicle potential and space-environmental conditions to detect the onset of spacecraft charging. It will operate a plasma discharge device to neutralize charge buildup. The plasma discharge operates on xenon gas, ignites in one second, and requires only 10 watts of power.

Heat pictures are screening printed circuit boards for such defects as open or short circuits and failed components. The Automatic Infrared Test & Inspection System (AITIS) uses a cooled, 60-element infrared detector to create a high-resolution thermogram. A computer compares a tested board with a master thermogram stored in computer memory. Components that appear too warm or too cool are shown in color-coded temperatures on a video monitor. As a complement to automatic test equipment, AITIS saves time and money. Hughes developed AITIS under its independent research and development programs and contracts with the U.S. Army Missile Command and U.S. Air Force.

A trio of multipurpose communications satellites has been introduced by Hughes to handle standard communications and direct TV broadcasting to homes. All three are drum-shaped and spin-stabilized. One model, designated HS 393, is the domestic communications satellite of the future. It can carry 16 high-power channels or 48 channels at lower powers. A second spacecraft, the HS 394, has a flat, sun-tracking solar array, thereby combining the best features from the existing technologies of spin-stabilized satellites and body-stabilized satellites. The third model, the HS 399, is a small spacecraft with 12 channels. Occupying only one-fourteenth of a space shuttle cargo bay, it could be launched for about one-third the cost of orbiting a standard 24-channel satellite.

An advanced factory management system model, developed by Computer Aided Manufacturing-International and Hughes, will help optimize use of manufacturing resources. The model will address interactions of all work areas within every level of the organization. It will precisely identify department production capacities, queue bottlenecks, and resource flow.

A broadband gallium arsenide field-effect transistor that operates in the 20 GHz frequency range has been introduced by Hughes. The new power transistor chip, designated Model C0311H-2000, is guaranteed to operate in a 50-ohm system over a typically 2-GHz bandwidth. It is designed as a medium power driver with 6.5 dB gain guaranteed at a 100 mW output level.

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HUGHES

512K from page 99

vong Systems, Inc. of Sunnyvale, Calif., was the first company to announce plans for a Macintosh local-area network, but that project "has gone down on our priority list," said sales director John Houghton. "We haven't seen the total acceptance of the Macintosh by corporations."

Christiansen and many others suggested that the 512K Macintosh is overpriced, as Apple charges $1,000 for the model's additional 384K bytes of memory.

Ron Ward, executive vice-president at Future Computing, Inc. in Richardson, Texas, also noted the lack of a hard disk drive from Apple itself.

Meanwhile, many still question Apple's commitment to the Fortune 1000 market. Those who downplayed Apple's push drew further ammunition two months ago at a National Computer Conference press session, when Sculley said bluntly that "we never set [large business sales] on our agenda for 1984."

However, Gregory Kelsey, senior technology analyst at Hambrecht & Quist in San Francisco, took an upbeat view of the Macintosh's long-term potential.

"When business software is available next year, so too will be many of the missing pieces to the Macintosh's use in large corporations," he predicted. "One will see products like a local-area network, laser jet printers and links to IBM mainframes."



COMPUTER INDUSTRY

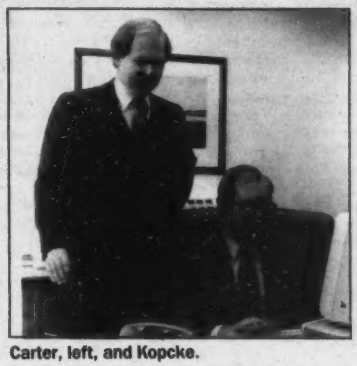
EPS looks to rewrite the book on DSS market

By Paul Gillin
CW Staff

WINDHAM, N.H. — "The problem with most mainframe software today is that it was developed 10 years ago," said John Kopcke, vice-president of research and development at Evaluation and Planning Systems, Inc. (EPS), based here. "We were absolutely forced to rewrite our product in 1976 to run on IBM hardware. We learned then that there was a lot to be gained by rewriting programs periodically," he said.

Kopcke made that point recently to try to distinguish EPS' FCS decision support system (DSS) from some very tough competition. Since 1976, EPS has rewritten FCS three other times: In 1981, 1983 and again this year. Since FCS runs on more than 40 operating systems and is written in assembler language on many of them, the projects have not been cheap. But the extremely competitive field of DSS does not lend itself to complacency.

EPS acknowledges that it has been a quiet company since it entered the U.S. market in 1979. It is usually not mentioned in the company of the big three vendors of decision support: Management Decision Systems, Inc., which makes Express, one of the first packaged DSS; Comshare, Inc., developers of System W; and Execucom Corp., which markets IFPS.



Carter, left, and Kopcke.

However, EPS is hardly a bootstrap operation. Founded in England in 1973, the company originally developed FCS as a financial planning and data base management system for accountants, planners and analysts. Today's product bears little resemblance to the original software. The company now employs more than 300 people worldwide in 45 offices throughout 22 countries. Since 1979, it has built a base of 1,200 customers. Revenues increased to $15 million last year, and the company is growing at a 40% clip annually.

EPS also is now preparing a marketing and new product push in an effort to seize upon the settling and acceptance of the DSS concept. The information center has made DSS a hot, if ill-defined, item. In general, the software embodies very sophisticated financial modeling and statistical capabilities wrapped up in graphics, spreadsheet, report writing and program-

See DSS page 127



■ The computer industry is booming and Uncle Sam is buying/110

■ Speaking to security analysts recently, Joseph A. Boyd, chairman of Harris Corp., told of plans to build a "work group system" and expressed satisfaction with the acquisition of Lanier Business Products, Inc./118

■ A number of questions were raised concerning Sequoia Systems, Inc.'s recent entry into the fault-tolerant processor market/119

■ Digital Equipment Corp. recently joined the Association of Data Processing Service Organizations, Inc. and also announced a cooperative maintenance program for original equipment manufacturers selling DEC gear/120

Paperless office may be on horizon



INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

The long-awaited era of the paperless office may be fast dawning if a recently introduced optical storage product proves to be efficient and reliable.

Filenet Corp. recently unveiled its Document-Image Processor system, a product that would seem to make the tantalizing prospect of optical storage a realistic alternative for environments where massive flows of paper documents present an unwieldy and expensive drag on business growth planning.

At the heart of the system is the company's "jukebox" optical disk storage and retrieval (Osar) library. This product is also being offered to OEMs for inclusion in large, integrated systems.

End user's view

To the end user, however, Filenet is offering Osar as part of a departmental work-flow system, according to Ted Smith, president and founder.

With a base configuration priced just over $250,000, that departmental package may prove tantalizing to businesses that have discovered that clustered word processing devices do little to alleviate mountains of paperwork or even improve the flow of information.

The base configuration provides 64 optical disks with 128G bytes, a document entry station, an image display station, a laser printer and word processing and data base management software. Even more interesting, perhaps, is the IBM 3270 "window" through which the user can communicate with a mainframe.

According to Smith — and he is not alone in this view — "the last real void in office automation" is the inability to do away with paper.

He claims his system will provide banks, insurance companies and others that deal in rivers of forms and letters with guaranteed document storage, work-flow automation and the ability to do away with file cabinets and the possibility of misplaced files.

The only question in this corner

See OSARS page 126

Analyst advises prudence when eyeing mergers

By David Olmos
CW Staff

NEW YORK — Companies contemplating expanding their horizons through a merger or acquisition should proceed with caution, lest a good deal quickly turn sour, computer industry representatives were warned recently.

Because of the shakeout taking place in the computer services industry, many would-be merger targets would make better orphans than marriage partners, according to Esther Dyson, president of Edventure Holdings, Inc. in New York.

"Don't rescue a company that doesn't deserve to be rescued," Dyson cautioned at a recent seminar here on mergers and acquisitions in the computer services industry. The forum was sponsored by the Association of Data Processing Services Organizations, Inc. (Adapso) and Broadview Associates, a Fort Lee, N.J., consulting firm that specializes in mergers and acquisitions.

Dyson told about 30 company representatives that merger-seekers should care-

See MERGE page 124

FOR VAX USERS

WHO'S SLOWING DOWN THE COMPUTER?



The utility companies are not the only ones who wish they could determine appliance use during the day. The MIS manager wishes he could better determine the use of his "appliances" — the computer system — as well.

Around 2 o'clock in the afternoon, the CPU begins to slow down. Manager Bill's phone begins to ring. Users want to know if the system is down. "No," he says, "we're just overloaded."

But Betty from the accounting department says, "I can't even get a prompt on my terminal. It's been *hours*." "I'll see what I can do," Manager Bill says.

He hangs up the phone and snarls under his breath. He finally finds out that Programmer Bob is running a big compile. "What are you doing?" he says. "I have to get this done," Programmmer Bob answers. "But you're slowing down the entire system," the manager retorts. "It's not me," Bob says. "It's Simpson. He's running one, too." Meanwhile his phone rings and rings and rings . . .

PACS is the Process Accounting and Chargeback System software which will heighten user-awareness of computer use — because it allows you to charge them for it. PACS wasn't designed just to increase user cost-awareness, of course, but it does give an added bonus to hard-pressed dp departments. It also works to the advantage of all end-users, because everyone becomes less wasteful of computer time, allowing for faster overall information processing.

PACS tells you everything you ever wanted to know about your VAX: who uses it, what projects are worked on, how much time is spent, and what specific resources are used. It lets you assign charges for system use, define billing periods, set up flexible rate schedules, create custom or standard invoices, and establish user budgeting.

It is also a capacity planning tool. It will give you detailed resource usage information so that you can plan on future expansion, or optimize present operations.

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Federal DP spending expanding under GSA schedules

OUTSIDE LINES
Andrew Mohr

The General Services Administration (GSA) estimates that federal agencies will have purchased approximately $1.5 billion of DP equipment under the GSA's DP schedules by the end of fiscal year 1984, according to Phil Butler, director of the schedules division.

This represents a 25% increase over the $1.25 billion that federal agencies spent under the GSA's schedules in fiscal year '83 and an almost 50% increase over the $900 million spent in fiscal year '82. Moreover, Butler expects purchases under the GSA's DP schedules to reach $2 billion to $2.5 billion dollars in fiscal year '85.

GSA DP schedules are indefinite quantity contracts awarded to numerous manufacturers, distributors and dealers. The GSA uses schedules to permit agencies to buy commercially available goods without the delay or expense entailed in conducting a formally advertised or negotiated procurement for each purchase. The GSA's Office of Information Resources Management now manages three DP schedules as well as schedules for telecommunications equipment.

The majority of purchases are expected under the GSA's general purpose DP schedule, commonly called the Section A schedule. This schedule provides for the purchase, rental and maintenance of system configurations, control I/O and storage devices, analog/hybrid systems and software. The GSA expects $1.2 billion in purchases under the Section A schedule alone. There are approximately 250 vendors with GSA Section A schedules.

The GSA also expects $200 million in purchases under its Section B schedule, which provides for the procurement of DP supplies, peripherals and accessories. Approximately 200 contractors participate in the Section B Schedule. In addition, the GSA estimates $50 million in purchases under its newly established Section C schedule, which provides for the purchase of end-user micro hardware and software.

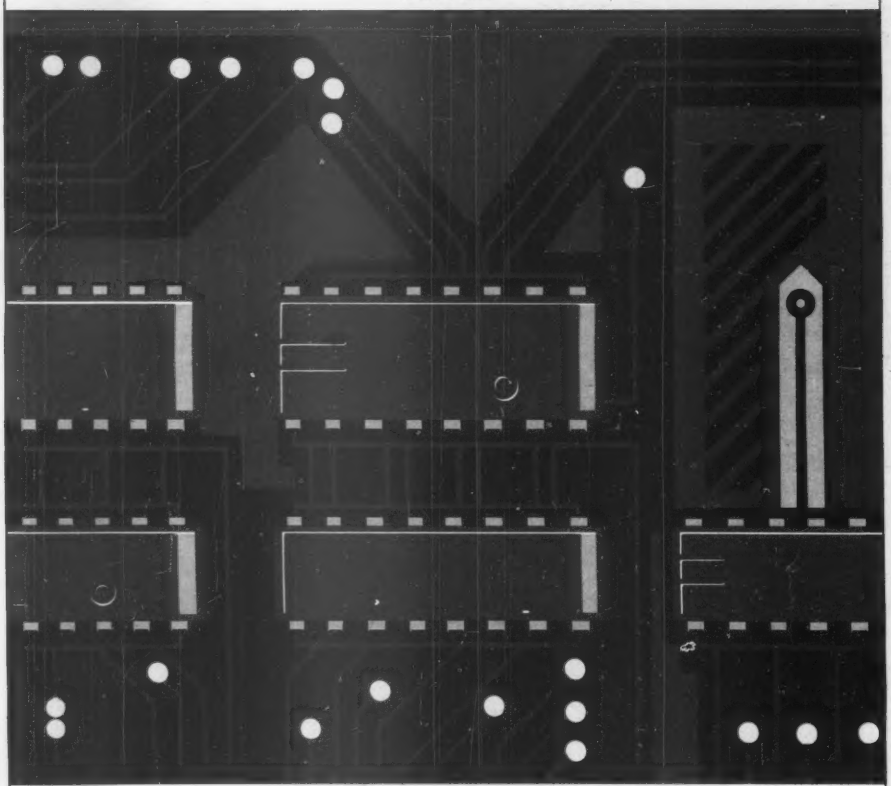
There are only 90 vendors in the Section C schedule program, which, unlike Sections A and B, limits each item make and model to only one contractor. The GSA believes sales of microcomputers under the Section C schedule will increase as federal agencies grow accustomed to this new contractual vehicle.

Telecommunications equipment schedule buys are expected to increase as a result of AT&T's recent divestiture, accordingly to the Office of Information Resources Management's Butler. The GSA's FSC 58 Part Six schedule encompasses equipment such as telephone key sets, private branch exchanges and facsimile machines. The GSA estimates $35 million in purchases for this schedule in fiscal year 1984.

Added to the growth of the GSA's DP and telecommunications schedules is the expected growth of large dollar, competitive procurements, which are expected to increase steadily over the next several years.

Mohr practices at the law firm of Cohen & White in Washington, D.C., specializing in federal procurement and computer law.

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Burroughs adds products group

DETROIT — Burroughs Corp. recently announced the formation of a new office and media products group to market data processing and office supplies worldwide.

The organization will include the company's office products group, international business forms and supply division and the media products group of Memorex Corp., a Burroughs' subsidiary. The group, which will employ 6,000 people worldwide, will manufacture, market and service such products as flexible disks, data- and word-processing supplies.

Profits rise at Datapoint

SAN ANTONIO — Datapoint Corp. reported its profits for the fourth quarter ended July 28 were $5.4 million, or 27 cents a share, compared with $4.2 million, or 21 cents a share, for the year-earlier period.

Fourth-quarter profits included extraordinary gains of $1 million, or 5 cents a share.

Revenue for the quarter increased 19.7% to $164.6 million from $137.5 million a year ago.

The company said its backlog of orders at the end of fiscal 1984 amounted to $89.3 million, down from $103.6 million at the end of fiscal 1983.



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Blue chip service from IBM.

Harris chief reveals plans for basic office network

By Charles Babcock
CW New York Bureau

NEW YORK — In a recent briefing before the New York Society of Security Analysts, the chairman of Harris Corp. discussed the acquisition last year of Lanier Business Products, Inc. and said his company plans to introduce a "work group system" later this year.

Joseph A. Boyd was vague on what elements would be included in the work group or when it would be available, but emphasized that the company was seeking to launch a rudimentary office network.

Following the meeting, several analysts concluded that the system will be built around a Lanier word processor, until now a stand-alone machine. Harris acquired Lanier Business Products of Atlanta in October 1983 for $276 million and shelved development of its own word processor.

"The thing you have to remember about Harris," said Herbert S. Kleiman, analyst with Prescott, Ball & Turben of Cleveland, "is that they've had trouble bringing out their systems the past couple of years. The work group could be very potent or it could be very humble."

A synergistic match

According to Boyd, Harris' acquisition of Lanier was a synergistic match between Harris' development capabilities and Lanier's established reputation with small business. He added that the acquisition would allow the Melbourne, Fla., company to go beyond the stand-alone products that it had specialized in until now. "We haven't provided the connectivity that our customers need," Boyd said.

Lanier has an installed base of $200 million worth of word processing products, and that base will help establish Harris "as a major participant in the office automation market," Boyd said.

Boyd said that Harris is looking for Taiwan production facilities in order to keep its office equipment line competitive. Harris currently employs 30,000 people at 35 plants around the country, primarily in the Southeast.

Harris manufactures radio, satellite transmission, telecommunications, semiconductor and minicomputer equipment. Its overall strategy consists of tying its communications capabilities to its office machine and minicomputer production, according to Boyd.

Staff combined

Although the merger of Lanier Business Products into Harris brought together two dissimilar sales staffs, Boyd called Lanier's commission-based staff a needed addition to Harris.

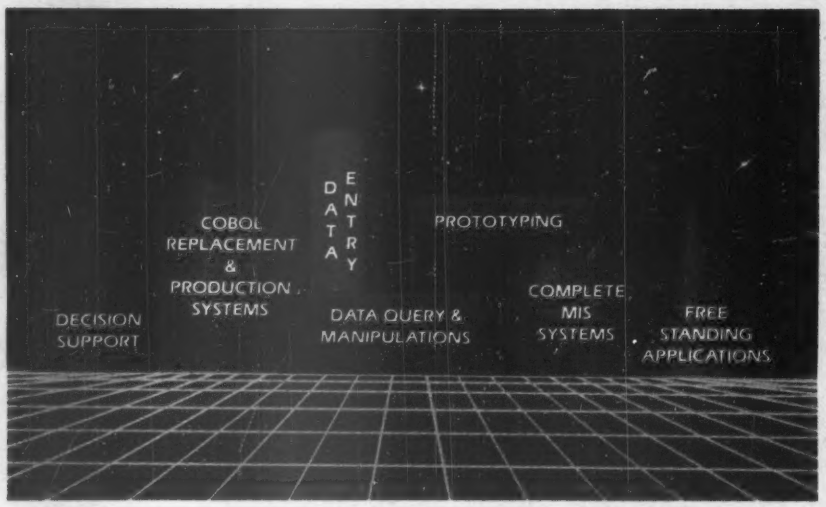
As a second-tier company in the office automation field, Harris needs to build a more effective sales force, one that can address small companies, he said. The Lanier merger added 4,500 sales and service people to Harris.

Boyd acknowledged that profits in Harris' Information Systems Division were still not what he wanted them to be, in part due to price pressure from IBM. Last year the division's net income dropped 13.4% to $7.1 million. One of its leading products is an IBM 3270 terminal emulator. "We are under severe competition," he said.

Boyd said the outlook for semiconductor sales remains strong, with Harris' Cmos version of the Intel Corp. 8088 microprocessor chip in production. The Cmos version performs the same functions as the Intel chip at a 90% power reduction, according to a Harris spokesman.

Prescott, Ball & Turben's Kleiman said the Intel deal established Harris' Cmos production competence. Harris is now trying to win a market share with the company's gallium arsenide circuits.

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Apple names MSA as plaintiff in pact breech

SAN JOSE, Calif. — Apple Computer, Inc. recently filed suit against Management Science America, Inc. (MSA) and its Peachtree Software, Inc. subsidiary, seeking $1.2 million in damages on allegations that MSA and its subsidiary failed to honor a contract to develop software for the Apple III and III+ systems.

Apple, in a suit filed in Superior Court, charged MSA and its subsidiary with fraud and breach of contract.

The companies, according to the Apple suit, signed a contract in January 1982 in which Peachtree allegedly agreed to develop applications software for the Apple micro.

Apple charged that Peachtree failed to abide by the schedule set forth in the contract, and it asked the court to award payments for lost revenues, punitive damages and return of $200,000 that Apple said it paid to Peachtree.

High-end credibility emphasized for Sequoia's success

Keeping target market in focus, delivering promised throughput key to respect

By John Desmond
CW Staff

NEW YORK — If Sequoia Systems, Inc., with its large-scale system priced from $290,000 to $1.5 million, is to be successful in the fault-tolerant, on-line transaction-processing market, the company will have to earn respect for its name in the market and prove it can deliver on its promises, analysts in the field suggested.

"One of [its] problems is to establish credibility at that high end, relative to [Tandem Computer, Inc.] and [Stratus Computer, Inc.]," said Stephen K. Smith, a security analyst for Paine Webber Mitchell Hutchins, Inc., who has reviewed the recently announced Sequoia system. "It does not seem that a system this expensive will draw droves of value-added resellers [VAR]," Smith said. He added that Tandem cut prices to stimulate that VAR market.

Instead of aiming specifically at the OEM market or at the end user, Sequoia intends to reach both markets, at least initially. "The danger of trying to do both is to do neither properly," Smith said.

He praised the technical aspects of the Sequoia system, citing the extensive experience of Sequoia's management in fault-tolerant systems, but he suggested the product may be overengineered. With a minimum system cost of $290,000 for a processing speed of 2.5 million instructions per second, Smith wondered, "Do you get more fault-tolerance than you need and not enough throughput?"

Bob Dascanio, president of Combinet, a partnership of the Bank of Boston and Baybanks, Inc., said that in the on-line transaction processing market, "The big question now is not fault-tolerance but throughput. I'd have to question whether these guys [Sequoia] really have throughputs of over 100 transactions per second. If they do, they would get the interest of the [banking] networks."

Dascanio said he would be convinced once he saw the Sequoia system installed and operating in a real or simulated environment. "The key thing is the cost per transactions and what the throughputs are," he said.

Competing with IBM

Don Moehrke, vice-president of product management at A.O. Smith Data Systems Co., which produces software for electronic funds transfer systems, questioned whether a system based on the Motorola, Inc. 68010 microprocessor could achieve enough throughput to compete with IBM. "The biggest problem I see in that environment is memory contention," he said. "I'm very skeptical of shared memory accessing a lot of CPUs. They've got to have some pretty impressive ways of getting in and out of there fast." He said the company's test-and-set system, which is said to break memory up into small units to ease contention problems, sounds good in concept.

Like Dascanio, Moehrke said he would have to see a Sequoia system operating to be convinced of its performance. Such a test would be expensive and time-consuming.

On the choice of AT&T's Unix as an operating system, Moehrke said, "I think it's a good choice, although there isn't much software out there for it yet."

Paradyne stands behind SSA pact before House

WASHINGTON, D.C.— A U.S. House panel, continuing its probe of the Social Security Administration's (SSA) computer contract with Paradyne Corp. at a recent hearing, heard the company strongly defend its performance against criticism from the General Accounting Office (GAO) and a competing systems integrator.

"We believe the company has done an excellent job at the [SSA]," said Paradyne President Robert S. Wiggins in his testimony before the House Government Operations Committee. The committee is investigating the Largo, Fla.-based system integrator's installation of a network of intelligent terminals at 1,350 SSA regional offices [CW, Aug. 13].

The GAO, which has urged termination of the contract, charged that Paradyne's P8400 controller was not an off-the-shelf integrated item as SSA required, and that Paradyne had demonstrated a different controller.

Richard C. Litsinger, president of Sigma Data Computing Corp. of Rockville, Md., the second lowest bidder, made similar charges and urged Congress to terminate the Paradyne contract and open new bids.

Paradyne's Wiggins responded that components of the P8400 were off-the-shelf items, and that SSA rules allowed substitute components.

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DEC becomes member of Adapso

ARLINGTON, Va. — The Association of Data Processing Service Organizations, Inc. (Adapso) recently announced that Digital Equipment Corp. has become a member, bringing the association's membership to more than 700 companies.

Robert Tirman, DEC's manager of communications policy, is DEC's key representative to the organization, Adapso said. Tirman said, "Adapso provides DEC with another avenue to establish close working relationships with independent computer software and services companies. In addition, the association represents the industry on issues that are important to DEC's future, including taxation, accounting practices, software protection, telecommunications policy and international trade."

According to Jerome L. Dreyer, Adapso president, "DEC's involvement will help further Adapso's influence in government relations and industry issue development."

A trade association founded in 1961, Adapso represents companies marketing software products, processing services, professional services and integrated systems.

Software Arts obtains rights to Visi Calc

WELLESLEY, Mass. — A lengthy legal feud ended last week when Visicorp agreed to pay Software Arts, Inc. $500,000 in contested royalty payments for the Visi Calc software program.

Software Arts, which authored the Visi Calc spreadsheet program marketed by Visicorp, will also receive the "Visi Calc" trademark and all marketing rights to Visi Calc. The out-of-court settlement between the two firms stipulates that Software Arts is to receive all customer lists and the copyrights to Visi Calc manuals.

Visicorp of San Jose, Calif., has agreed to change the name of Visi On Calc, its independently developed spreadsheet program, to Visi On Plan. Visicorp will continue to market other Visi series products and its Flashcalc spreadsheet.

In addition, the two companies have agreed to end all lawsuits between them. "We're pleased it's over with," said Daniel S. Bricklin, chairman of Software Arts, based here. "We would have settled for this [amount] a long time ago."

Visicorp initiated the legal battle when it sued Software Arts for $6 million, claiming the Visi Calc developer was behind schedule in developing follow-on programs and a new version for the IBM Personal Computer. In a countersuit, Software Arts claimed that Visicorp had failed to market the program aggressively.

DEC offers OEM system service plans

STOW, Mass. — Digital Equipment Corp. recently announced a service maintenance program designed for OEMs that purchase products from DEC.

The OEM Portfolio, DEC said, contains two major alternatives. Under the Blue Chip program, DEC will provide full, on-site service or carry-in maintenance service on the equipment delivered to users by OEMs, with the OEM company acting either as a sales agent for DEC service contracts or as a distributor and reseller of DEC maintenance services.

The Partnership Program provides for maintenance support by DEC for the OEM's own service offerings.

According to David A. Rosi, OEM marketing manager for DEC's Field Service group, "The OEM Portfolio is a far-ranging program that signals a firm commitment by Digital to a cooperative, flexible partnership with our OEM customers in the delivery of high-quality maintenance services and products to their end users."

Support for OEMs

Under either alternative program, DEC will assign a field service account manager to provide OEMs with assistance and support and to serve as a communications liaison with DEC management.

The partnership program provides a range of services in four main categories, DEC said.

Infield support services include telephone technical support, on-site response by a senior engineer in four hours and emergency parts exchange.

Exchange services

Board repair and exchange services include a rapid response mail service for personal computer board exchange, factory repair services and extended warranty services.

A maintenance tools program provides varied maintenance support services.

An educational services program includes prepackaged courseware and classroom seminars on operator training and hardware maintenance.



Firm's offshoot capitalizes on computer-mapping void

By David Olmos
CW Staff

ANDOVER, Mass. — A few years back, John P. Bowen and some colleagues at Equifax, Inc.'s Geographic Systems Group hoped to explore the untapped commercial promise of computer-mapping technology.

But executives at Equifax, an Atlanta-based information services firm, decided that computer mapping did not mesh with their business plan. Bowen and two other principals of the Geographic Systems Group decided to buy out the division. Taking a core of 13 employees with them in December 1980, they founded Geographic System, Inc. (GSI) to market mapping software.

"We decided we wanted to exploit and build an organization on this technology," said Bowen, president of GSI. Until that time, computer mapping had been used almost exclusively for noncommercial applications such as urban and environmental planning.

Bowen and company cofounders Spencer A. Joyner, executive vice-president, and Marjorie Titcomb, vice-president, were banking on the future growth of the business graphics market to propel their venture. When GSI was founded, "business graphics was still pretty expensive and hadn't really taken off," Bowen said in an interview here.

Today, significant improvements in the price and quality of peripheral devices used to turn graphics displays into hard copies have sparked the market's expansion. With industry researchers predicting a business graphics boom in this decade, GSI's founders believe they are beginning to reap the rewards of the well-defined market niche they have carved out.



Geographic Systems Group's Bowen.

"We feel that our original concept of what the market was and what it could be has been borne out," he added.

The company has several decision-support software packages that integrate masses of sales and customer information from a corporate data base, residing in an IBM mainframe, with geographic and demographic data. The information can then be analyzed and displayed in the form of maps.

Bowen said the company's software is designed to help companies make decisions related to the 'where' question, such as: Where to locate the next store? Where are the most profitable customers? Or where should the next sales office be located?

In one application, *The New York Times* used GSI's products to zero in on households of potential *Times'* readers in New York and other metropolitan areas. The newspaper has used the maps to establish circulation goals, to allocate sales personnel and to evaluate home delivery routes.

Bowen cited increasingly sophisticated corporate marketing strategies as a key ingredient in the company's success. "It's only been within the last couple years that companies have realized the tremendous marketing potential of their computerized data bases and have begun to tap them," he said.

The privately held firm numbers among its clients such industry leaders as Coca-Cola Co., Eastman Kodak Co., Federal Express Corp., Shearson/American Express, Inc., Standard Oil Co. of Indiana and Sears Roebuck & Co. As Bowen sees it, these companies share one thing in common. "They are intensely market-driven firms," he said.

GSI has grown from its 13 original employees to 35. Earlier this year, the company moved to new offices in a picturesque, 150-year-old former mill in Andover.

Bowen said business has been good and that revenues have roughly doubled each year since the company's founding. He said that because GSI is privately held, he could not disclose specific earning or revenue figures, though he did note that "there has not been a growth in profit."

A year ago, the company brought in two outside investors, Allstate Insurance Co. and Golder, Thoma and Cressey, Inc., a Chicago-based venture capital firm. Bowen said the investment group has decided that "we aren't going to concentrate on profit at this point, but will concentrate on growth."

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Market Hall will be open Wednesday and Thursday, 10–5; Friday 10–4:30.

USER CONFERENCE/WORKSHOP SCHEDULE

SESSION TIME	WED., OCTOBER 3	THURS., OCTOBER 4	FRI., OCTOBER 5
12:00–1:00	**IBM KEYNOTE PRESENTATION:** Software in the 80's	Outlook for Integrated Software Understanding Local Area Networks* Data Base Management Software Update†	How to Get Service & Support You Need What's Available in Banking Software* How to Succeed In Business Graphics†
1:00–2:00	The Outlook for Portables Getting Started With Your PC* Telecommunications and Beyond†	What to Expect From Networks How to Choose a Printer* Integrated Software Applications†	Compatibles Update Software for Oil Industry* Everything You Wanted to Know About Interface Boards and Peripherals†
2:00–3:00	Overcoming Executive Computerphobia The Outraged Consumer's Guide to Word Processors* Networking Architecture†	PC Security Software for CPA's* Linking PC's to Large Host Networks†	**INDUSTRY/USER DISCUSSION** (2:00–4:30)
3:00–5:00	Communications on the PC: The Bridge to Productivity (Session followed by ½ hour Roundtable Discussion)	Evaluating Software Packages: Try Before You Buy (Session followed by ½ hour Roundtable Discussion)	

*INTRODUCTORY

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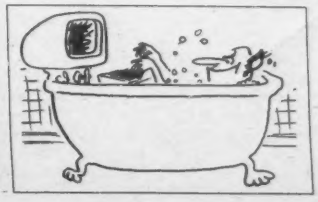
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EXECUTIVE CORNER

Edward H. Means has been appointed president of Gnostic Concepts, Inc., a subsidiary of Data Resources, Inc.

■

David Fradin has been named president and chief executive officer at First Byte, Inc.

■

James W. Power has been named president and chief executive officer of Basix Corp.'s subsidiary Basix Controls Systems Corp.

■

Dr. Russell F. Henke has been appointed president and general manager of the imaging and graphics division of Gould, Inc.

■

Hank Scheinberg has been appointed president and **James W. Buddle** has been named executive vice-president and chief operating officer at Arrays, Inc.

■

Dr. Ivan A. Cermak has been appointed president of ITT's Telecom Network Systems Division.

■

Vaemond Crane has resigned as president, chief operating officer and as a director of Computer Consoles, Inc. **Herman Affel**, chairman and chief executive officer, will resume his responsibilities.

■

William Baker has been promoted to the newly created position of executive vice-president and chief operating officer at Silicon Systems.

■

Jack Ward has been appointed vice-president, production operations at Codex Corp.

■

Dr. David J. Calabro has been promoted to vice-president of Genasys Corp.

■

Forest Majors has been appointed vice-president of strategic planning for the Financial and Insurance Systems Group of Informatics General Corp.

■

Heiner Krapp has been appointed vice-president of European operations at CAE Systems, Inc.

■

Leading Software Technologies Corp. announced that it has filled two newly created positions. Joining the firm are **Wayne F. Gacnik**, vice-president, operations, and **Wayne A. Chevalier**, sales manager.

■

George B. Sublett has been named vice-president, finance, and **Deborah M. DeFilippo** has been named controller for Relational Database Systems, Inc.

■

David J. Horton has been named vice-president and general manager of Amdahl Corp.'s Communications Systems Division.

■

Don France has been appointed executive vice-president and **John Wark** has been named director of systems software product management at Walker Interactive Products, Inc.

■

Earl Andrew has been named vice-president of operations and **Charles Bischof** has been appointed director of domestic manufacturing at Corona Data Systems, Inc.

■

Ungerman-Bass, Inc. has restructured its management team and consolidated its engineering groups. **Charlie C. Bass**, cofounder of Ungermann-Bass, has been elected vice-chairman of the board of directors, and **James F. Jordan** has been appointed executive vice-president.

■

John B. Munson has been named president and chief operating officer of International Systems, Inc.

■

Gerald W. Fleming has resigned as executive vice-president and a director of Rexon, Inc., as well as president of its subsidiary Rexon Business Machines Corp. Fleming intends to pursue other business interests.

■

Henry A. Kaplan has been appointed to executive vice-president at Thoughtware, Inc.

■

Joseph J. Ciasullo, executive vice-president of international operations at Datapoint Corp., has resigned to pursue personal business interests.

■

Barry Burke has been appointed vice-president of operations at Ashton-Tate.

■

Richard A. Baldwin has been named executive vice-president at Userware International.

■

Rich Ward has been promoted to senior vice-president and director of field operations at Hamilton/Avnet Electronics.

■

Richard Streller has been elected chairman of the board of Hogan Systems, Inc.

■

The board of directors of Silvar-Lisco announced the election of **Paul Seckendorf** as chief executive officer.

■

Laura G. Stolowitz has been appointed president of Compupro Corp.

■

Ronald J. Bleakney, president of Santec Corp., Amherst, N.H., has been named its chief executive officer. Bleakney replaces **Jeffrey Chu**, who will remain as chairman and devote his full time to the establishment of a joint venture with the People's Republic of China.

The negotitations for the joint venture have been actively pursued during the past 12 months and are expected to be concluded by the end of this year.

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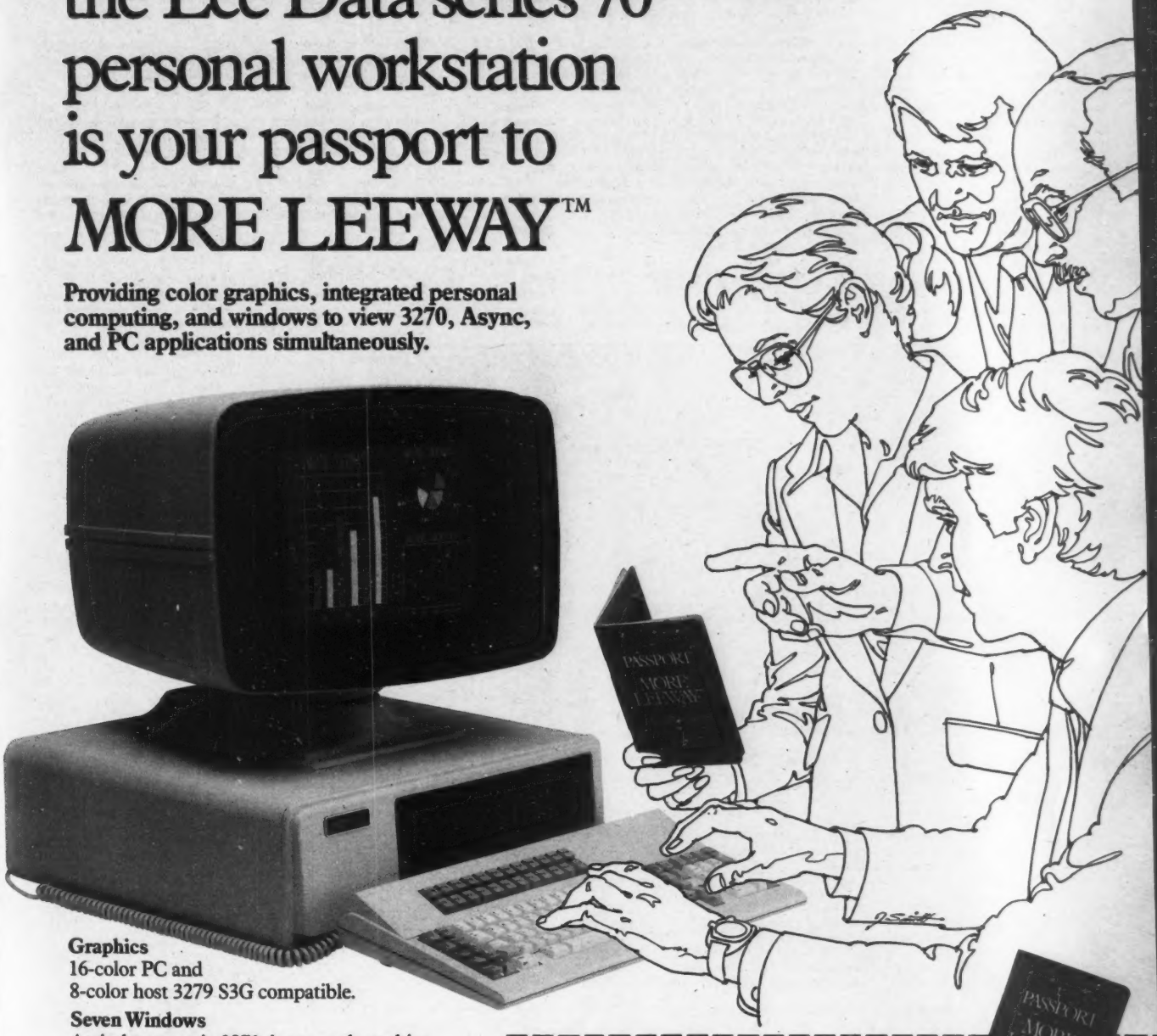
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Mergers, acquisitions total $3 billion for first half of '84

NEW YORK — In the first six months of this year, there were 55 mergers and acquisitions in the computer services industry with a combined record value of $3 billion, according to an index produced by Broadview Associates and the Association of Data Processing Organizations (Adapso).

Helping to inflate that $3 billion merger volume were two giant acquisitions by General Motors Corp. and McDonnell Douglas Corp. In April, McDonnell Douglas paid $307 million to acquire Tymshare, Inc., and in what would be the biggest acquisition in the history of the computer services industry, GM announced in June that it would pay $2.55 billion to acquire Electronic Data Systems Corp., a deal not yet consummated.

In a recent seminar here sponsored by Adapso and Broadview, representatives from two dozen companies came to learn about the pitfalls and promises of playing the merger game. Similar forums are conducted periodically by Broadview, a Fort Lee, N.J.-based consulting firm that specializes in computer service marriages.

While big transactions such as the GM and McDonnell Douglas deals grab most of the headlines, most merger activity is concentrated among much smaller firms. In 1983, for example, 146 transactions took place involving computer service firms, with the median transaction totaling $2.5 million, according to the Broadview/Adapso index.

Thirty percent of the acquisitions in 1983 involved vendors providing various processing services such as on-line, batch or facilities management. In the first half of 1984 there have been 36 acquisitions involving processing service vendors.

Software vendors accounted for 60% of total acquisitions in 1983 and have made up 65% of the activity in the first half of 1984, according to several Broadview representatives.

During the past three years, computer services companies have dominated the acquisition activity, representing more than 82% of all transactions during that period. Most of the companies that are acquired are privately held, while many of the acquirers are public concerns, according to Broadview.

Among the usual reasons why a company acquires another firm are to achieve growth, to diversify, to gain a marketing advantage, to acquire an existing customer base or to obtain the expertise of management in the acquired firm, according to George Grodahl, also a partner at Broadview.

Some of the keys to a successful merger lie in such things as the two parties having a "willingness to give and take, a valid basis for merging and a mutuality of wants and goals," Grodahl said.

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Here are just a few of the hundreds of entries listed in the Computerworld and MICRO MARKETWORLD Indexes:

Index	Heading	# Entries
CW	Microcomputers	179
CW	Graphics Systems	112
CW	Networks: Local Area	76
CW	Disk Equipment	100
MMW	Dealerships	58
MMW	Disk Equipment	81
MMW	IBM PC, PC jr.	78
MMW	Microcomputer Market	43

We also have Indexes from 1976 for Computerworld, as well as Indexes for ISO WORLD from 1982.

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MERGE from page 115

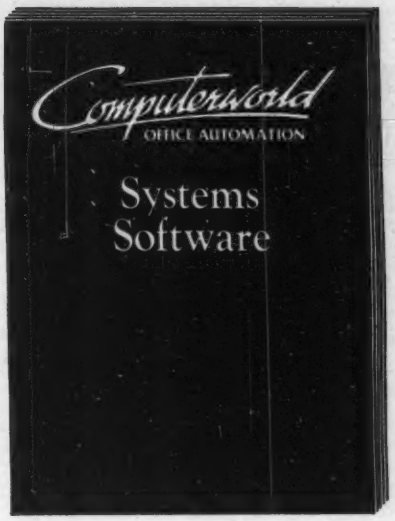
fully consider a company's products, technology and personnel. She advised against acquiring a software company, for example, that manufactures the "200th spreadsheet" on the market or is competing head-on with the Lotus Development Corps. of the industry.

Smart companies should probably be acquiring a technology rather than an already existing application. "And maybe you shouldn't be acquiring companies, but rather people," Dyson said, who also edits the "Release 1.0" newsletter.

Vertical markets represent the best opportunities for success with a merger partner. "The place where you can still have an impact is in vertical markets," Dyson commented.

When linking up with a software vendor, companies should look first to those firms developing products for the IBM Personal Computer AT or Apple Computer, Inc.'s Macintosh, Dysan advised.

If you miss the next issue of CW Office Automation, look at the issue you'll miss



December

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NICKELS AND DIMES

Molecular Systems, Inc. announced revenues for the first quarter ended June 30 of $1.1 million, compared with $7,713 for the like period a year earlier. Profits were $17,341, or .005 cents per share, compared with a loss of $99,656, or .03 cents per share, a year ago.

■

Nixdorf Computer AG announced revenues for the first half of 1984 increased by 20% to $454 million.

■

Emulex Corp. reported revenues for the fiscal year ended July 1 of $80.1 million, compared with $34.3 million in the comparable period one year earlier. Profits were $11.7 million, or 88 cents per share, compared with $5.5 million, or 45 cents per share, one year ago.

■

Pansophic Systems, Inc. reported that revenues for the first quarter ended July 31 rose to $12.5 million, compared with $10.6 million for the same period a year ago. Profits were $1.1 million, or 14 cents per share, compared with $1.6 million, or 12 cents per share, a year ago.

■

Planning Research Corp. announced profits for the fourth quarter of $2.6 million, or 39 cents per share, compared with $2.5 million, or 35 cents per share, in the same period one year ago. Revenues were $84.9 million, compared with $82.3 million in the like quarter one year ago.

Integrated Circuits, Inc. announced revenues for the third quarter of $2.35 million, a 16% increase over $2.03 million in the like quarter one year earlier. The company lost $16.7 million, or 1 cent per share, compared to earnings of $125,941, or 8 cents per share, a year earlier.

■

International Rectifier Corp. reported profits for fiscal 1984 of $8.1 million, or $1.34 per share, after utilization of tax loss carry forwards of $2.8 million, or 46 cents per share. This compares with a net loss of $15.5 million, or $2.77 per share, in fiscal 1983, which included a loss of $11.4 million from the disposal of Rachelle Laboratories' largest business line.

■

Amdahl Corp. announced it signed a $565 million global credit agreement with 17 international banks including Bank of America as agent. The agreement provides a new unsecured revolving credit line of $465 million and $100 million in letters of credit to replace a previous $370 million facility expiring this year. The new revolving credit facility extends through 1987, at which time Amdahl has the option to repay the outstanding borrowings in installments though 1991.

■

Silvar-Lisco reported an operations loss of $895,000, or 13 cents per share, on revenues of $2.8 million in the first quarter ended July 31. This compared with the previous year's first-quarter profit of $48,000, or 1 cent per share, on revenues of $1.6 million, which included a nonrecurring item of $300,000.

■

Western Digital Corp. announced revenues for the fourth quarter of $41.6 million, compared with $17.4 million in the like period one year earlier. Profits were $3.2 million, or 20 cents per share, compared with $873,000, or 6 cents per share, in the same quarter one year ago.

■

U.S. Design Corp. reported profits of $45,000, or 1 cent per share, compared with a net loss of $347,000 in the like period one year ago. Revenues were $3 million, compared with $1.6 million a year ago.

■

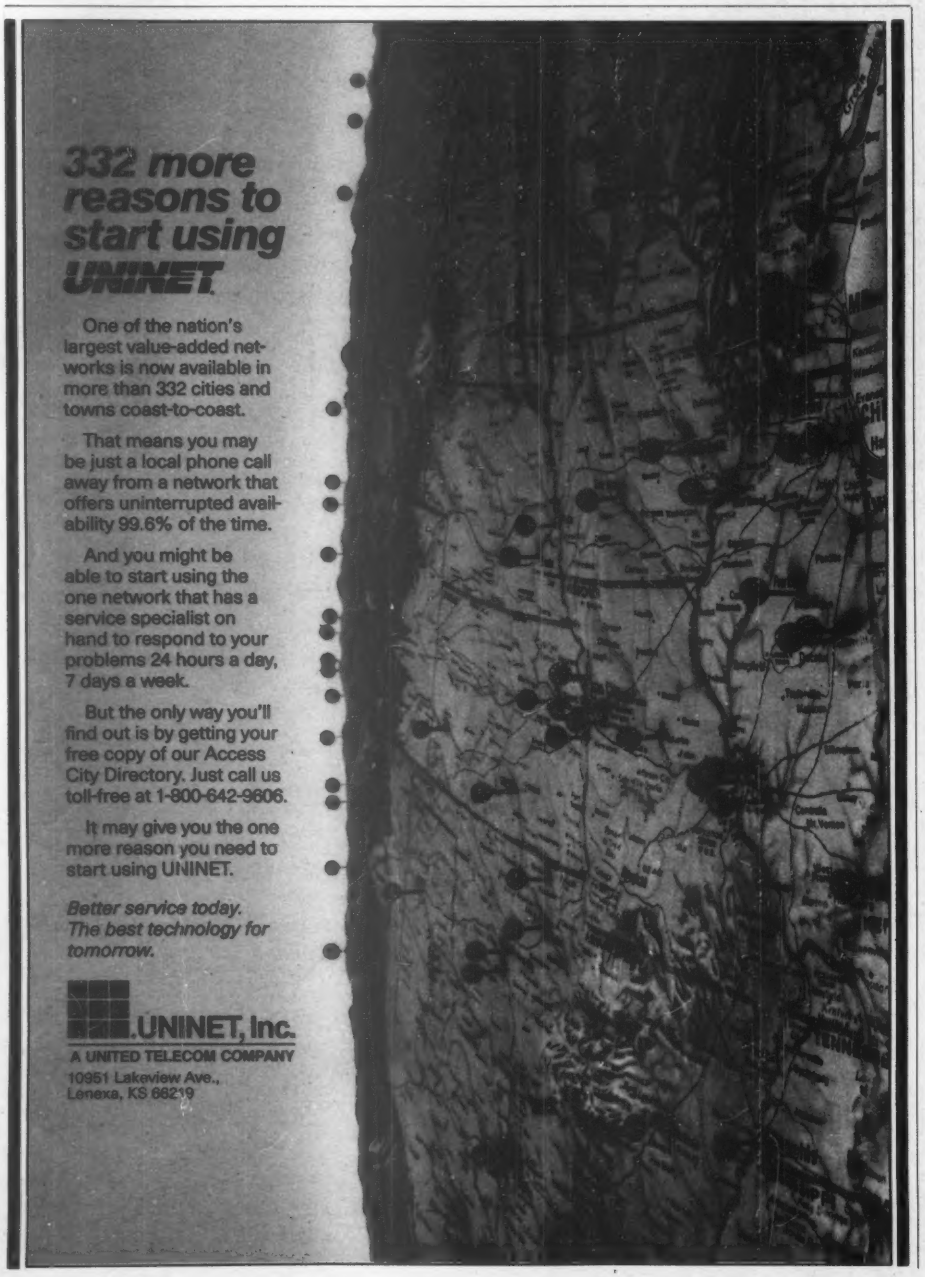
Computer Automation, Inc. reported a net loss for the fourth quarter of $1.9 million, or 97 cents per share, compared with a net loss of $248,000, or 12 cents per share, in the same period one year earlier. Revenues were $14 million, compared with $14.8 million in the like quarter one year ago.

■

Citel, Inc. announced a second-quarter loss of $5.4 million, or 51 cents per share, compared with a loss of $285,000, or 3 cents per share, for the like period last year.

■

Icot Corp. reported a loss of $2.3 million, or 26 cents per share, for the year ended July 30, compared with a year-earlier loss of $6.4 million, or 94 cents per share; revenues for the year were $18.9 million, compared with $9.6 million a year earlier. The company recorded a fourth-quarter profit of $65,000, or 1 cent per share, compared with the fourth quarter a year earlier when it reported a net loss of $4.1 million, or 48 cents per share, including a loss of $2.7 million on the sale of its micrographics business assets; fourth-quarter revenues were $6 million, compared with $4.6 million one year earlier.



OSARS from page 115

rests with the essentially electromechanical jukebox.

With robotic disk transfer and magnetic cache capabilities, the system will provide insignificant delay, and files can be managed according to the procedures of the particular office, according to Smith.

With a maximum configuration of eight Osars and multiple workstations, only hands-on experience will determine whether retrieval works simply or not at all, Smith said.

SUPERSHORTS

MTTR, Inc. has signed a multiyear agreement to install and maintain the **Dynapac** line of packet-switching equipment — the Multipad X.25 Packet Assembler/Disassembler and the Multiswitch X.25.

■

CBS Educational and Professional Publishing, a division of CBS, Inc., announced a contribution of funds to support "Project Athena," a five-year experiment at MIT to explore the educational potential of computer technology in college instruction. **Digital Equipment Corp.** and **IBM** have provided MIT with equipment, software, service, maintenance, research money and personnel.

■

United Telecom Communications, Inc. has signed an agreement with **Consolidated Rail Corp. (Conrail)** for up to 3,250 miles of right-of-way for the installation of its fiber-optic communications network. The agreement terms have not been disclosed.

■

Heraeus Amersil, Inc., a supplier of waveguide quartz tubing, will open its first U.S. plant near Atlanta, Ga., in early 1985. The $7 million facility will be built in Buford, Ga.

■

Icot Corp. announced that **NCR Corp.'s** third-party maintenance organization has been selected to provide full maintenance services for Icot products on a worldwide basis.

■

Amdahl Corp. announced that **Rotelcom, Inc.**, a subsidiary of **Rochester Telephone Corp.**, will market, distribute and support Amdahl's data communications products and systems under a multimillion-dollar, nonexclusive agreement.

■

Affiliates of **Services by Satellite, Inc.'s (Satserv) Campus Conference Network** can now receive live videoconferences from the Institute of Electrical and Electronics Engineers (IEEE) through a new agreement signed in August. The videoconferences are live five-hour broadcasts starting at 11 a.m. Eastern Standard Time and received at Campus Conference Network sites throughout North America.

■

Alphacom, Inc. announced it won a temporary restraining order in an unfair competition and trade secrecy suit against Sunnyvale, Calif.-based **Omniprint, Inc.**, a company founded by ex-officers of Alphacom. The order enjoins Omniprint from soliciting Alphacom's OEM customers, representatives and distributors with the intent of selling products similar to Alphacom's. It also prohibits Omniprint from communicating any information that is derogatory or unfavorable to Alphacom.

■

Robert E. Lorenzini, president and chief executive officer of **Siltec Corp.**, announced the firm will be forming two separate business units in place of the current divisional structure. The instrument division of Siltec will be renamed **Cybeq Systems**, a business unit of Siltec Corp. The silicon division will be renamed **Siltec Silicon**.

DSS from page 115

ming components. Often a DBMS is also employed, according to EPS.

DSS is a complicated concept which embodies such difficult-to-grasp functions as multidimensional modeling, sensitivity analysis and optimization. In an effort to boost sales by relieving customer worries, EPS is emphasizing its support network, which it claims is unique in the DSS field.

The three-tiered network includes at the first level a local account manager who serves installations in the immediate area and is available to handle basic questions. Regional offices serve larger areas and employ a second level of specialists who handle more complex applications and technical questions, EPS said.

At the top level, a support group at the national headquarters is available for especially perplexing problems and also serves as a middleman between the software development group and the local support centers. A hot line is also available.

The company is also looking to differentiate itself technically in a field in which technical nuances are often as difficult to comprehend as the DSS concepts themselves. Perhaps the major selling features of FCS are Business English, a programming language, and the Interactive Data Base (IDB) system, an embedded DBMS oriented toward small but volatile applications.

Under the IDB, for example, a data base can be either flat file, relational or hierarchical, depending on the use, EPS said. It is oriented toward performing consolidations by any number of keyed fields. Data can be viewed not only in rows and columns, but in "slices" that run across multiple data bases, and many views can be defined for the same data base.

Business English includes mathematical and financial functions and allows formulas to be created and stored so that they can be invoked with one command.

The language can also be used to write programs, EPS said. In fact, the company routinely prototypes new versions of FCS in Business English before rewriting them for production, according to Chris Carter, president for North American Operations at EPS.

Will EPS knock Comshare or Execucom out of the market? That is hardly likely, Carter stated. Rather, he believes the DSS market "is tremendously underpenetrated."

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Sanders Associates reports 32% rise in profits for fourth quarter of 1984

NASHUA, N.H. — Sanders Associates, Inc. said that its profit for the fourth quarter ended July 27 rose 32% to $15 million, or 78 cents a share, from $11.4 million, or 61 cents a share, a year earlier.

Revenue for the quarter increased 34% to $229 million from $171.5 million a year ago.

Sanders Associates said that its board of directors voted to increase the present annual dividend to 56 cents per share from 44 cents per share.

MSA buys educational software house

ATLANTA — Management Science America, Inc. (MSA) recently announced the acquisition of Designware, Inc. of San Francisco, a supplier of education software for microcomputers.

MSA paid $2 million in cash for all outstanding stock of Designware.

John P. Imlay Jr., chairman and chief executive officer of MSA, said Designware products will be handled through MSA's Peachtree Software, Inc. subsidiary, and they will utilize Designware's existing network of national and regional distributors and dealers.

Designware publishes 11 microsoftware titles available for use on microcomputers developed by Apple Computer, Inc., Atari, Inc., Commodore International, Inc. and IBM.

Arthur Andersen awarded IRS contract

WASHINGTON, D.C. — The Internal Revenue Service recently selected Arthur Andersen & Co. of Washington, D.C., to design the tax agency's new Automated Examination System, which will put portable microcomputers in the hands of on-site auditors and link them with a host computer.

The design contract, awarded Sept. 7 for an indefinite amount, will run through 1989, according to Hiram Wilcox, IRS contract specialist. He said the IRS initially awarded $1,475,000 to the firm and is negotiating the price of several other parts of the contract.

Wilcox said that the firm will design the Automated Examination System, will develop the specifications for the portable computers that the IRS will buy next year, will develop hardware and software specifications for the full-scale system and will provide support for the agency's acquisition of the system.

Still to be awarded are contracts for the portables to be used in the nationwide system and for the hardware and software of the host computer.

A pilot program is already underway at the Boston district office, where 16 IRS field agents use portable computers for on-site auditing [CW, Aug. 27].

Fortune, North Star terminate merger talks

REDWOOD CITY, Calif. — Fortune Systems Corp., based here, and North Star Computers, Inc. of San Leandro, Calif., recently announced they had discontinued merger discussions.

In a joint statement, the companies said the decision to cease the discussions was an amicable one. The possible merger was announced last month [CW, Aug. 27] when Fortune provided North Star with a $3.75 million debt financing convertible to 19% of North Star stock. Fortune said the termination of merger discussions would not affect the terms of the loan agreement.

Fortune, which produces multiuser microcomputer systems operating under AT&T's Unix, had previously indicated it would acquire all outstanding North Star stock in exchange for four million shares of Fortune stock. North Star manufactures an IBM-compatible multiuser microcomputer system.

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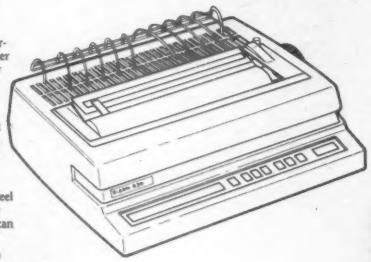
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MERGERS AND ACQUISITIONS

Ducommun, Inc. and **MTI Systems Corp.** jointly announced the signing of a definitive agreement for the acquisition of MTI by Ducommun. In the transaction, expected to be completed in early October, the shareholders of MTI will receive $3 cash per share.

■

Softcom, Inc., San Francisco, has been acquired by **Hayes Microcomputer Products, Inc.**, Norcross, Ga. The cost of the acquisition was not disclosed.

■

BPI Systems, Inc., Austin, Texas, announced controlling interest in **Softrend, Inc.**, Salem, N.H. Through an exchange of approximately 980,000 of its shares of common stock, BPI Systems acquired more than 90% of the Softrend common stock and all of its preferred stock. The transaction will be treated as a pooling of interests. BPI plans to acquire all remaining common stock through a merger in the near future.

■

Telco Systems, Inc., Menlo Park, Calif., completed the acquisition of **Telebit, Inc.**, making the Illinois-based manufacturer of digital telecommunications products a wholly owned subsidiary of Telco Systems. The acquisition, which was made in exchange for Telco Systems common shares, follows a 15-month association of the two companies.

■

Zitel Corp., San Jose, Calif., has acquired **Gifford Computer Systems, Inc.** of San Leandro, Calif., for 250,000 shares of Zitel common stock. Gifford will operate as an autonomous subsidiary of Zitel Corp.

■

Dynatech Corp., Burlington, Mass., announced the acquisition of the European operations of **Tesdata Systems Corp.**, McLean, Va., and the technology related to Tesdata's Smart-3 product line for $2.85 million in cash.

■

Continental Telecom, Inc. (Contel), Sunnyvale, Calif., and **Codata Systems Corp.** jointly announced Contel's acquisition of Codata, a manufacturer of Unix-based microcomputer systems for the OEM marketplace. Terms of the acquisition were not available.

■

CXI, Inc. announced that it has recently signed an investment agreement and a five-year, renewable licensing and manufacturing agreement with **ITT.** CXI has also granted ITT a significant minority equity interest in the corporation.

■

TIE/Communications, Inc. announced the acquisition of **Turret Equipment Corp.** and the appointment of David C. Ruberg as its new president.

Turret Equipment designs durable high-speed telephone systems with multiple hot lines for use by the financial community, civilian and national defense agencies and military command posts. Terms of the acquisition were not available.

■

Applied Circuit Technology, Inc., Anaheim, Calif., announced an agreement in principle to acquire **Epro Corp.** of San Jose, Calif. Terms of the agreement were not disclosed.

■

DBS International, Inc., Montgomeryville, Pa., has merged into **Esprit Computer Products, Inc.**, a strategic business unit of **Esprit Systems, Inc.** Terms of the agreement were not available.

■

Satellite Syndicated Systems, Inc. (SSS) of Tulsa, Okla., announced that it has acquired a minority interest in Atlanta-based **Videostar Connections, Inc.** SSS has purchased 9% convertible, redeemable preferred stock, which will be converted into as much as 14% of Videostar's common stock.

■

Accountants Library of Professional Software (Alps), Portland, Ore., has acquired the professional services division of **Timberline Systems, Inc.**, a Beaverton, Ore., manufacturer of software systems.

Tymshare, Inc.'s On-Site Professional Accounting Systems Division, which previously held the marketing rights to the Timberline Systems accounting software products, has also been acquired by Alps. Terms of the acquisition were not available.

■

Morre Business Forms, Inc., Chicago, has purchased the assets of **Genra Group**, a Dallas retailer of computer hardware, software and supplies. Terms of the sale were not available.

■

Ultimate Computer Services, Inc. (UCS), Denville, N.J., has announced the acquisition of **TSC Data Terminals**, Roselle, N.J., a company active in the sale, service and rental of data communications terminals and accessories.

TSC Data Terminals will continue operating under its own name, but will become a subsidiary of UCS, merging with the existing micro computer maintenance division. Terms of the acquisition were not available.

■

Century Data Systems, Inc. has announced the sale of its support services activities for disk drive models 44A, 44B, 31 and 33 to **Pacific Business Data Systems**, an electronic service company located in Dublin, Calif. Terms of the sale were not available.

■

An agreement valued at more than $10 million to sell electronic printers to **MegaCom, Inc.** was announced by **Xerox Corp.** Exact terms of the agreement were not disclosed.

■

On-Line Software International, Inc. and **Boole & Babbage, Inc.** announced the signing of an agreement transferring ownership of Boole & Babbage's Secure/CICS software program to On-Line Software International. Terms of the sale were not available.

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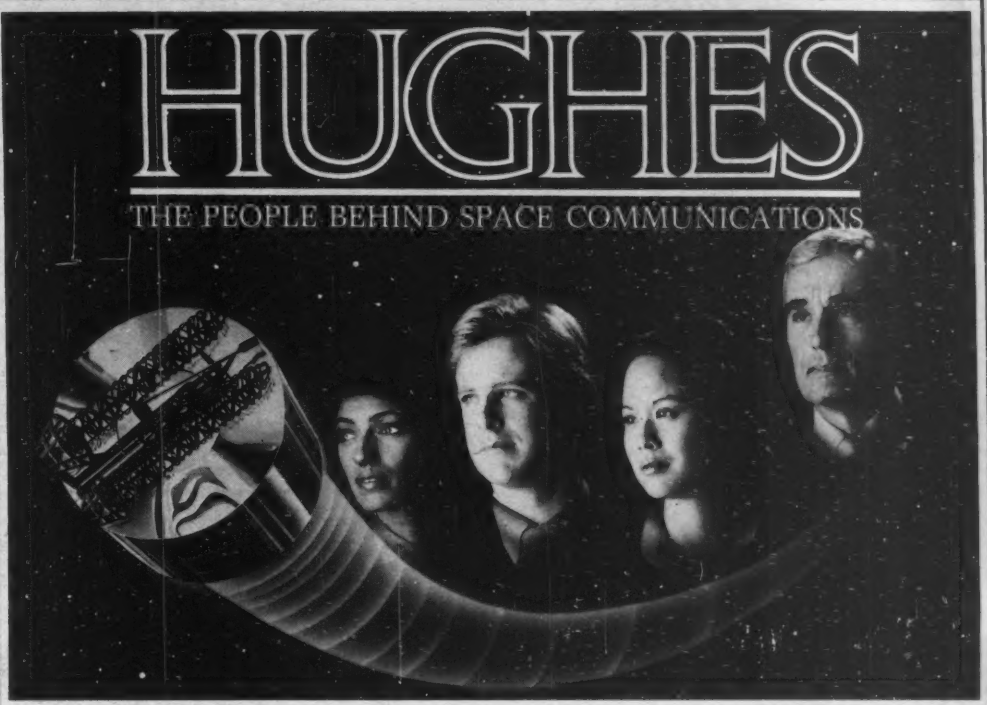
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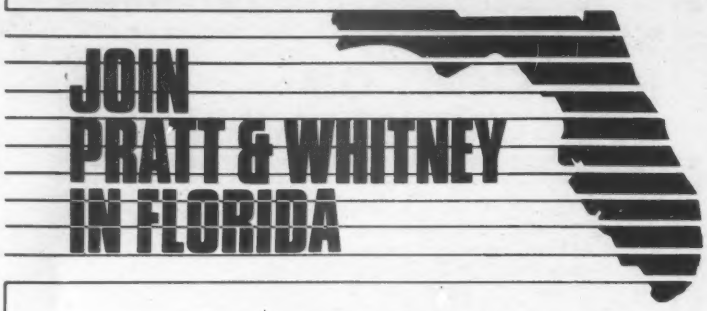
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Racal-Milgo currently houses both a Univac 1100/81 system and a new IBM 3083 system. The IBM environment (MVS/XA) offers new development challenges using the following tools: Cullinet's IDMS, IDD, ADS-ONLINE, OLQ, Culprit TSO/SPF, ROSCOE/LIBRARIAN, Sync-Sort and much more.

The ideal candidates will have both Univac-1100 and IBM 30XX experience in progressive DP departments where a database management system is used (DMS 1100, IDMS, IMS, TOTAL). Bachelor's degree in Computer Science or Business is preferred. Candidates having proven track records in either large scale Univac or IBM systems will be considered for the following positions:

- **SR. ANALYST/PROGRAMMER** – You must have at least 5 years' DP experience with 3 years' designing integrated application systems. Excellent design skills with proven project leader experience a must. Experience in Cullinet software packages required.
- **MVS SYSTEMS PROGRAMMER** – You must have 2-3 years' experience in maintenance of MVS and all IBM utilities. Experience in maintenance of LIBRARIAN and ROSCOE preferred.

Racal-Milgo offers excellent salaries, complete company benefits, including 3 weeks' paid vacation, 100% paid tuition, life/medical/dental insurance, and one of the most pleasant working environments at our beautiful new Corporate Headquarters in Harrison Park. Please call 748-3507 or send your resume to:

Mr. Patrick Ahern, Employment Representative

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PROGRAMMER/ ANALYST

The Upjohn Company, a leading pharmaceutical company located in Kalamazoo, Michigan, is seeking data processing professionals for project development or to support application oriented systems.

Applicants must possess a BS degree and 1-2 years' experience plus strong analytical skills and math background; additional experience with TSO/SPF, and IMS are highly desirable.

Kalamazoo is a mid-sized Southwestern Michigan community offering a mix of cultural/recreational opportunities including lakes, nearby colleges, and a four-season climate. The Upjohn Company offers a competitive salary and benefits, and relocation assistance.

For confidential consideration, please call toll free from outside of Michigan 1-800-253-8600 and ask for extension 3-6767; or, from Michigan, call collect at (616) 323-6767. We'll send a specialized employment application to you immediately. Please refer to ad number **16732-E** when calling.

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SYSTEM NETWORK COMPUTER CENTER

Louisiana State University
User Services Assistant Director

Responsibilities include directing staff and providing consulting services, software implementation, documentation, and technical support for the academic community.

A college degree in computer science or closely related field is required, and an advanced degree is preferred. Applicants should have at least five years experience in user support in an academic environment. Strong managerial, organizational, and interpersonal skills are required. Preference will be given to applicants with experience using the MVS or VM operating systems on IBM mainframes, microcomputers, and microcomputer to mainframe communications. Support computers are 3081 and 3033 and a Data General MV/10000. Send confidential resume by September 30, 1984 to:

DR. JOHN M. TYLER, Director
SYSTEM NETWORK COMPUTER CENTER
LOUISIANA STATE UNIVERSITY
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Compensation and benefits are competitive and you will enjoy our marvelous coastal location plus long-term career growth potential.

Interested candidates should forward a resume, with salary history, in confidence, to: **Joanne Harris, Personnel Manager, The Jackson Laboratory, Bar Harbor, ME 04609.** *Phone:* (207) 288-3371. Equal Opportunity Employer.

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Individual with experience in public access data base software development and DEC VAX hardware knowledge to create a system design and supervise its development, programming, and implementation. 3-5 years experience.

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SYSTEMS ANALYSTS With retail or merchandising background, and some technical experience. Will be involved in design of new "state of the art" merchandising systems.

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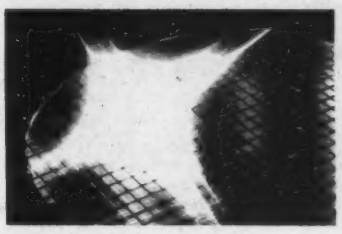
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This position requires an individual with a minimum of 3-5 years of directly related experience in a TANDEM environment. Responsibilities will include involvement in a wide variety of Technical Support roles. TAL language skills are essential and knowledge of PATHWAY and TANDEM communications software are desirable.

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Application forms may be obtained from:

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THE REGISTRAR
NATIONAL UNIVERSITY OF SINGAPORE
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In your request for application forms, please state -
(a) the field of research you intend to undertake; and
(b) your highest educational qualification.

Applications must be received by The Registrar, National University of Singapore by 31 OCTOBER 1984.

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Ana Farrow
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58 Pulaski Street
Peabody, Mass. 01960

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Paradyne, with a proven record of technological breakthroughs, continues to set the pace in the data communications/telecommunications industry. Our careers are specially designed to offer self-motivated individuals the freedom and support you need for both personal and professional growth.

PARADYNE CAREERS IN FLORIDA

With Corporate headquarters located in Florida's booming Tampa Bay area, we have the following career opportunities available:

MARKETING TECHNICAL CONSULTANT — Reporting to the Manager of Marketing Technical Information, you'll be responsible for the development and implementation of communications products for customers and Systems Engineers. You'll also determine software/hardware needs to customer specifications, interface with engineering on product design improvements and assist in the design of major networks to field engineers.

The qualified candidate will have a BS in Computer Science or equivalent, and 7-9 years experience as a Systems Engineer, Network Consultant or Systems Programmer, with some Marketing Support background. Good written and verbal communication skills essential to interface with customers as well as various departments in the company.

PRODUCT PLANNER—In this position, you'll develop long term product direction strategies as well as evaluate and analyze the market performance and competitive status of our current product line. You'll produce general product requirements to define new product concepts including application, features, function performance and cost.

To qualify, you must have 5 years of experience in planning, developing or marketing of computer/data communications products, a well as a background in product application.

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We offer an excellent compensation and benefits package, and every opportunity to make the most of your special expertise. If you'd like to explore this excellent career opportunity, please send your resume to: **Paradyne Corporation, Dept. WB, P.O. Box 2826, Largo, Florida 33540.** An equal opportunity employer, m/f.

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Is the rush of the big city giving you nothing but ulcers? At Kentron International in Central New Mexico we have all the benefits of living in the country coupled with the opportunity to work with latest technological frontier: space. You will work closely with the latest in space surveillance and deep space tracking equipment.

SR. SYSTEMS ANALYST
Master's degree in Mathematics, Physics, Engineering, Operations Research or Computer Science. 5 years experience as a Systems Analyst required.

SR. PROGRAMMER
BS degree in Mathematics, Physics, Engineering, Operations Research or Computer Science plus 3 years experience as a computer programmer required.

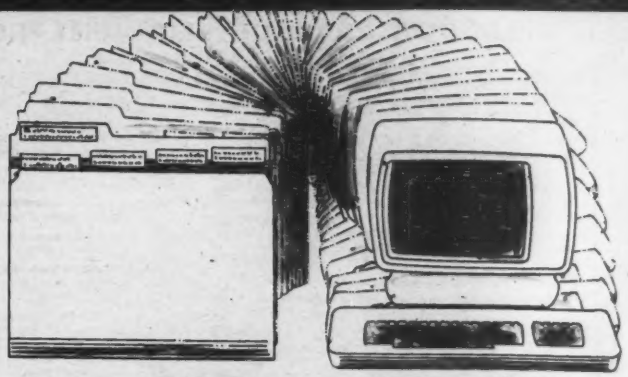
PROGRAMMER
BS degree in Mathematics, Physics, Engineering, Operations Research or Computer Science with 2 years experience as a computer programmer desired.

Qualified individuals who would like to become involved in one of the most exciting technologies available today should foward a resume or call:

Kentron International, Inc.

Michael Blenis, H.R. Manager
KENTRON INTERNATIONAL, INC.
Dept. C
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Socorro, NM 87801
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Join PRC as 15 million patents go from paper to automation.

Planning Research Corporation recently won a contract valued at more than $300 million to completely implement a paperless Patent and Trademark Office by 1990. When in place, the new system will cut by one-third the time required to process a patent from start to finish. There are over 15 million patents now, with 270,000 being added each year.

To store and display all of this electronically, and control the entire process, PRC plans to use a vast mix of traditional and state-of-the-art computer and communications technologies. The key words for PRC are Systems Integration— a relatively new engineering discipline for combining multiple technologies for larger projects. We're building a team of ELITE professionals to work on these projects.

It's going to be very fast-paced and exciting in the next few years. If you have any of the following expertise and skills, we would like to share this time and the opportunities it affords.

Project Managers
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Communication System Designers
Hardware Engineers
Senior Programmer Analysts
CICS Systems Programmers
Programmer Analysts
Project Control Specialists
Communications Elec. Engineers

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IBM 308X, 303X, or PCM equivalent
Motorola 68000, Intel 8086, others
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Optical mass storage devices
Image processing

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Ethernet
XNS protocols
VTAM/TCAM/NCP
X.25
Digital PABX systems

OPERATING SYSTEMS
MVS/SP or MVS/XA
UNIX (Berkley 4.2 or Sys V)

LANGUAGES/ DATABASE SYSTEMS
Mainframes: PL/1, COBOL or Assembler
Micros: "C" or Assembler
ADABAS

Please send your resume in confidence to: Planning Research Corporation, 1500 Planning Research Drive, Department KO-6, McLean, Virginia 22102. An Equal Opportunity Employer M/F/H/V.

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Government Information Systems

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(603) 772-5400

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THE PROJECT WE ARE TALKING ABOUT—
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The hardware environment is IBM 3083 and 4341 under MVS. The on-line interactive database projects are being developed primarily on IDMS. This project involves creating an entirely new network architecture and building prototype systems that will become industry standards.

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We want people who love challenge, who thrive on change, are creative and self-starting. For most positions a Bachelors degree or equivalent experience in data processing is preferred. Candidates should possess top notch organizational, oral and written communication skills.

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Talent and effort are rewarded both financially and with increased responsibility. *The compensation package is extremely competitive*—and includes company-paid benefits, savings and stock ownership plans, credit union, educational assistance, relocation, and free parking.

THE EXPERIENCE WE ARE LOOKING FOR

We are especially interested in professionals with 2-4 years of IDMS experience including hands-on knowledge of ADSO, CULPRIT, and other Cullinet software enhancement tools. A strong background in COBOL is required for most positions and a solid working knowledge of TSO/SPF and IBM MVS JCL is preferred.

POSITIONS: Programmer Analysts/Applications Development, Technical Analysts/Development Support, Senior MIS Analysts/Data Processing Planning, Senior Technical Analysts/Configuration Management, Senior Database Administrators, Project Managers, Senior Systems Analysts/Applications Development, Senior Operations Managers.

AREAS: Database Design & Development, Requirements Analysis, Configuration Analysis/Management, Data Communications Analysis, Network Architecture, Performance Monitoring & Evaluation, Quality Assurance & Standards, Applications Systems Development, Documentation, Training, Operations.

For interested and qualified candidates, initial interviews will be arranged in your local area. For immediate consideration, please call or forward your resume in confidence to George A. Ridenour, President, NEXUS Associates, 5881 Leesburg Pike, Suite 101, Falls Church, Virginia 22041. Telephone: (703) 998-6363.

SUPPORT SERVICES MANAGER

Applications are being accepted for Support Services Manager, UNS Computing Center, Reno, Nevada. This position reports to the Assistant Director of Support Services. Primary responsibility will be management and technical support of the Programming Languages and Application Processor Support Services Section. This section supports all programming languages, database software and application tools on UNSCC CBC and Burroughs equipment. Requires a minimum of a bachelors degree, good communications skills both oral and written, 5 years experience in data processing with 2 years in supervision of software analyst programmers, indepth knowledge of three or more computer languages including FORTRAN and COBOL, and ability to work with diverse individuals in a tactful, productive manner. Salary: $26,000 - $35,700 depending upon skills and experience. Application deadline: October 24, 1984. Send letter of application, resume, and the name, address, and telephone number of at least 3 professional references to: Paul Franklin, UNS Computing Center, University of Nevada, Reno, NV 89557-0023. The University of Nevada System is an Equal Opportunity/Affirmative Action Employer.

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We have been retained by several nationally known insurance corporations (throughout the country) to assist in expanding their MIS Departments. Their needs vary from D.P. Managers to Senior Planning and Programming Analysts with life insurance software package experience.
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Anderson/Watson & Associates
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Building #3, 1827 Powers Ferry Road
Atlanta, GA 30067
(404) 951-1255

DATA BASE SPECIALISTS

Northrop Advanced Systems Division, dedicated to advancing technologies and resolving complex challenges to America's defense, has created new opportunities within our Computer Systems Department for Data Base Specialists.

These highly visible senior-level positions involve IMS DB/DC data base systems development for key technical and business organizations. Within our Pico Rivera Division, ideally located in Southern California, our progressive team of talented computer professionals are performing data-related activities to develop an integrated data base environment.

Your technical background will qualify you for these immediate openings if it includes extensive experience with on-line and batch IMS DB/DC data base systems. Additional skills and experience in data base design methodology as well as logical data analysis and modeling is highly desirable.

The involvement, scope and dimension of these career pursuits are further heightened through some of the most tangible, comprehensive personal benefit arrangements available. Please send your resume to: **Dave Coffey, Computer Systems Employment Office, Dept. CW 9-24, P.O. Box 1138, Pico Rivera, CA 90660-9977.**

Proof of U.S. Citizenship Required. Northrop is an Equal Opportunity Employer M/F/H/V.

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NORTHROP

Advanced Systems Division
Aircraft Group

PROGRAMMER ANALYST IBM SYSTEM 38

Hilti, Steel industry Division, a leader in fastening systems and providing repair services to the basic steel industry is currently recruiting for an experienced IBM System 38 Programmer Analyst. The selected applicant will be responsible for designing, developing and implementing computer programs and systems using the RPG III language. In addition, the Programmer Analyst will develop standards, and proper documentation for new and existing programs and systems. The ideal candidate shall have 3-5 years technical programming and systems experience on an IBM System 38. This individual must be able to translate user needs and define and recommend programming and systems solutions. Excellent written and verbal communications skills are required. A bachelor's degree in computer science or business is necessary. We offer a competitive salary and benefits package. Applicants who have the appropriate background and feel they can meet the challenges of this career growth opportunity should send their resume including salary requirements to:

Hilti
Steel Industry Division
16819 Industrial Parkway
Cleveland, OH 44136
Attn: Personnel Manager

WESTERN ENERGY COMPANY NORTHWESTERN RESOURCES COMPANY

UNIVAC 1100

Our rapidly expanding coal mining companies have several current openings for self-motivated professionals with substantial experience with Sperry 1100 systems. PL/I, MAPPER and FORTRAN or COBOL are desirable. The following positions are open:

APPLICATIONS SUPPORT SPECIALIST - Successful candidates will spend several weeks at Company headquarters in the mountains of Western Montana, becoming familiar with our staff and data processing philosophy. Permanent assignments will be at Colstrip, MT or Huntsville, TX where you will be solely responsible for support of all local data processing activities. You must be able to interact well with end-user professionals (business and technical) to provide training, design, and programming assistance.

LEAD PROGRAMMER ANALYST - This position in Butte, Montana involves design, implementation, documentation and support of engineering and commercial computer applications. Your initial assignment will be in financial, accounting, or inventory systems.

Relocation assistance will be provided. To apply for any position, please send resume, with salary history, to:

Dr. N.P. Thiessen
Manager, Data Processing
Western Energy Company
107 East Granite
Butte, MT 59701
(406) 723-4349

Equal Opportunity Employer M/F

KENTUCKY STATE UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
TWO POSITIONS

Kentucky State University, a small, undergraduate, liberal arts, state supported institution has two positions in the department of computer science teaching various languages and the computer courses. Present computer system includes PDP/70 and micro computers.

Applicant for one position must have PhD in computer science. For the second position, a PhD in a directly related area is required. Experience in data processing is required for both.

Salary and benefits are competitive and commensurate with educational preperation and occupational and teaching experience.

Applicants should submit a letter expressing an interest in the position and a reseume which includes specifics of education, experience, and special qualifications to:

Chair, Department of Computer Science
KENTUCKY STATE UNIVERSITY
Frankfort, KY 40601

Application deadline is November 1, 1984. Positions are available for semesters commencing January, 1985 and August, 1985.
Equal Opportunity Employer

TECHNICAL MANAGERS

Major well established Atlanta based company is seeking qualified individuals to join our office automation staff. Applicants must have knowledge of data communications, computers and office automation equipment and should possess the following minimal qualifications: 4 year degree, 3 years or more successful related business experience and demonstrated leadership in their area of expertise. Candidates must be available for assignment in Birmingham, Alabama. Compensation based on experience. Excellent benefits.

PRODUCT MANAGER

Must have expertise in the analysis of markets and experience in introducing new and developing products. Background in voice/data terminals, transmission and switching systems and mini/micro computer software is essential. Capable of providing technical and marketing assistance to the sales force.

ACCEPTANCE LAB MANAGER

Experience in maintaining a laboratory of test equipment and products for use in conducting product evaluation. Must be technically and operationally proficient in product line offerings in the office automation field and have expertise in developing installation and maintenance procedures.

Respond by submitting resume and salary requirements in confidence to:

Personnel Department - CW
675 West Peachtree Street, NE
Rm. 42T81
Atlanta, GA 30375

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Join us in San Diego!

A position is available for a Senior Systems Programmer with TOPS-10 experience. Responsibilities will involve providing maintenance and development support for our User Service Center system software in a TOPS-10 SMP environment. Additional responsibilities will include support of a large fusion confinement device experimental program. BS in Computer Science, Engineering or Physics and 5 years experience in systems programming including TOPS-10, will be required. Experience with VAX/VMS would be desirable.

Please send your resume to:

GA Technologies, Inc.
Department HA
P.O. Box 81608
San Diego, CA 92138

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Computer Systems Analyst/Section Chief

Salary $23,213.34 - $31,219.38

Requirements: Graduation from an accredited 4 year college or university with major course work in computer science, mathematics, business administration or related field, and 3 years progressively responsible programming and system work of which 1 year must include administrative supervisory work. Experience in GEO-processing systems and knowledge of land base systems is highly desirable.

Send resumes to:

Alachua County Personnel
P.O. Box 1467
Gainesville, FL 32602

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Our leadership position has created many career opportunities for talented software professionals who would like to do the best work of their careers. If your experience matches the requirements listed below, we urge you to consider a leadership career with a leadership company: M/A-COM DCC.

SOFTWARE ENGINEERS

Several areas of application are available for talented software professionals. In one area, you will work on advanced Intel microprocessors and have responsibility for the design and implementation for the control of speech interpolation equipment. This position requires a BSCS degree and at least 4 years experience in microprocessor software development using high-level languages.

Another position exists for a talented individual to lead a software effort for ongoing maintenance, support, and enhancement for a large-scale, inplace network. You must have 2-5 years experience with Data General 16-bit minicomputers, RDOS operating system, DCU coding, or Z-80.

SECTION MANAGERS

We are seeking two Section Managers to join us. Responsibilities for the first position include providing technical and administrative support on various data communications projects. The ideal candidate will have a BS degree and 6-10 years experience on mini and microcomputers, preferably DEC, VAX 11/780, and Intel 8086/80186/80286.

Another position is available for a manager to direct efforts and work on maintenance and enhancement of all software operations and product support lines. A BS in Computer Science or related degree and at least 5 years experience in real-time system development and support are required. Experience with Intel 8086, PLM, and Pascal helpful.

We have additional software career opportunities available, including **Senior Principal Engineer, Principal Engineer,** and **Department Manager.**

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JEAN BRUFF
Employment Manager
M/A-COM DCC, Inc.
11717 Exploration Lane
Germantown, MD 20874

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AIRLINE RESERVATION SPECIALIST

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Qualified candidates should have a minimum of 10 years related experience which includes work on at least two automated reservation systems and extensive knowledge in the following areas:

- **Various ticketing operations including ticket-by-mail designs**
- **PNR construction techniques**
- **Queue management procedures**
- **Development of "user friendly" access systems**

Individuals with this background who can combine strong interpersonal skills and the ability to relate to corporate level management will find this career path a challenge to their professional expertise. Any exposure to IBM Systems and ADABAS a plus.

We offer salary commensurate with qualifications, accelerated reviews with advancement opportunity based upon accomplishments and a very attractive, comprehensive benefits package. For consideration forward a confidential resume with salary history and requirements to **Personnel Manager. INTERNATIONAL COMPUTAPRINT CORPORATION 475 Virginia Drive, Fort Washington, PA 19034.** An Equal Opportunity Employer, M/F

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ICC

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Senior sales support position to assist IBM mainframe customers planning communication networks using protocol converters and micro to mainframe linkups.

Minimum 5 years experience datacommunications, IBM SNA/BSC networks, IBM DB/DC systems such as CICS/IIMS/ICCP, ACF/VTAM. Strong oral and written skills required.

Position involves periodic domestic travel. Protocol converter experience a plus. Proof of U.S. residency required. Excellent salary and benefit package.

Qualified candidates send resume to: Judy Hegg

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Manage and maintain an interstate asynchronous poll-select network.

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Supervise 6-10 operators and coordinate processing in a multiple Burroughs systems environment.

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925 N. FLORIDA AVENUE
TAMPA, FLORIDA 33602

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OPPORTUNITIES FOR

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The Office of Naval Research is seeking highly qualified computer specialists to work with leading research scientists and engineers in developing a major state-of-the-art management information system. The Research and Development Management Information System (RADMIS) consists of IBM-4341-2 CPU, IBM 3350 disc drives and 3705 TCU linked to 5 IBM 5520 model 51s shared logic word processing system. The CPU uses VM/CMS Operating system and VS/APL, PL/1, IBM Assembly, QBE, ADRS II, GDDM, PROFS. These are Civil Service positions and salary depends on individual qualifications.

- **Computer Programmer Analysts ($25,489–$47,226 pa)**—The incumbents will direct major projects including systems analysis, design and programming development for the ONR RADMIS Computer Data Center. (Announcement #84-40A)
- **Computer Systems Programmer ($25,489–$47,226 pa)**—The incumbent will be responsible for analyzing, planning, organizing, directing and controlling all computer system software assets which provide support for the ONR RADMIS Computer Data Center. (Announcement #84-38A)
- **Computer Specialists ($21,066–$39,711)**—The incumbents will serve as Data Base Administrators responsible for designing data dictionaries, implementing and maintaining the Data Base Management Systems (DBMS). (Announcement #84-39A)
- **Computer Programmer ($21,066–$39,711)**—The incumbent will be responsible for designing data base specifications, coding and debugging COBOL programs on the UNIVAC 1163 system. Assignments will involve the transition, conversion and implementation from the NARDAC UNIVAC 1163 Computer, ONR-9300 RJE/UTS-20 computer system to the ONR in-house RADMIS. (Announcement #84-53)

Interested persons should submit a resume or Standard Form 171, Personal Qualifications Statement (available at Federal Job Information Centers or from the address below), to:

OFFICE OF NAVAL RESEARCH, Code 791SC (CW)
800 N. Quincy Street, Arlington, Virginia 22217

Applications will be accepted through 9 October 1984 and must be received by that date. Please indicate announcement number of position you are applying for. Applicants are requested to complete the appropriate supplemental forms. For further information and supplemental forms, please call (202) 696-4705.

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SCIENTIFIC PROGRAMMER/ANALYST

Needed at the University of Missouri-Rolla. A Bachelor's degree in electrical engineering, with emphasis in computer engineering and digital design, or an equivalent combination of education and experience is necessary. Exposure to at least two computer languages, one of which must be scientifically oriented, and familiarity with computer algorithms necessary to solve complex scientific problems are required. Software and hardware interfacing design and specification capabilities and hardware problem diagnosis and repair capabilities are desired. Extensive programming experience, especially on a VAX 11/780 running UNIX, is highly desirable. Experience or training in image processing and signal processing is preferred. Salary Range: $15,385-24,595. Excellent fringe benefits including educational assistance. Deadline for receipt of completed applications: October 12, 1984. For application forms, contact: **Personnel Services, G-1 Parker Hall, University of Missouri-Rolla, Rolla, MO 65401,** or call (314) 341-4241. UMR is an **Affirmative Action/Equal Opportunity Employer.**

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BSEE (Software/Hardware)	$30-45K
Prog/Anal (3 yrs IMS)	$25-35K
ALC Prog/Anal	$25-35K
Prog/Anal (2 yrs CICS)	$28-36K
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  - –4th Generation Languages
  - –Data Base Management Systems
  - –Word Processing/Electronic Mail
  - –Performance Measurement/Capacity Planning
  - –PC/Mainframe Communications
  - –Operating System Extensions
- **TECHNICAL SUPPORT SERVICES**
  - –Data Base Administrators and Consultants
  - –MVS/DOS/VM Technical Support
  - –Systems Programmers (MVS/VTAM/NCP)
  - –Systems Analysts/Programmers (DB/DC)
  - –Human Factors
  - –Standards and Procedures

ADR offers a comprehensive benefits package, liberal relocation assistance and compensation fully commensurate with your experience. For consideration, please forward your resume or call **Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.**

APPLIED DATA RESEARCH

An Equal Opportunity Employer

SYSTEMS PROGRAMMER

Expanding frozen food broker in East Bay Area (Calif.) seeks a systems professional with 2-5 years solid DOS/VSE, VM/CMS and CICS skills. Experience in data and voice communications is desirable. Individual will be responsible for installing, modifying, developing and recommending software, equipment and communications upgrades for an IBM 4341. Future duties include implementation of new software releases and installation of an IBM 4381. A degree in Computer Science is preferred; appropriate experience may be substituted. Send resume with salary history to

Continental Companies
Personnel Department
P.O. Box 4027
Concord, CA 94524
Resumes must be received by Wednesday 10/3/84

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SYSTEMS PROGRAMMER

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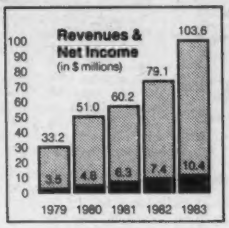
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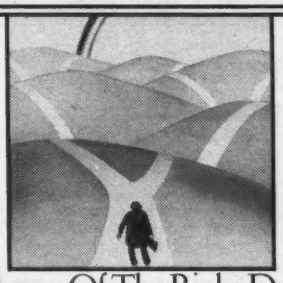
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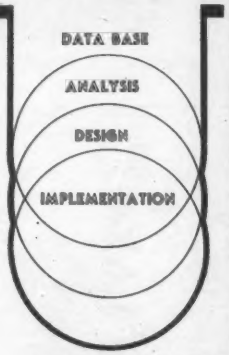
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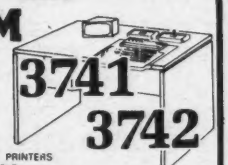

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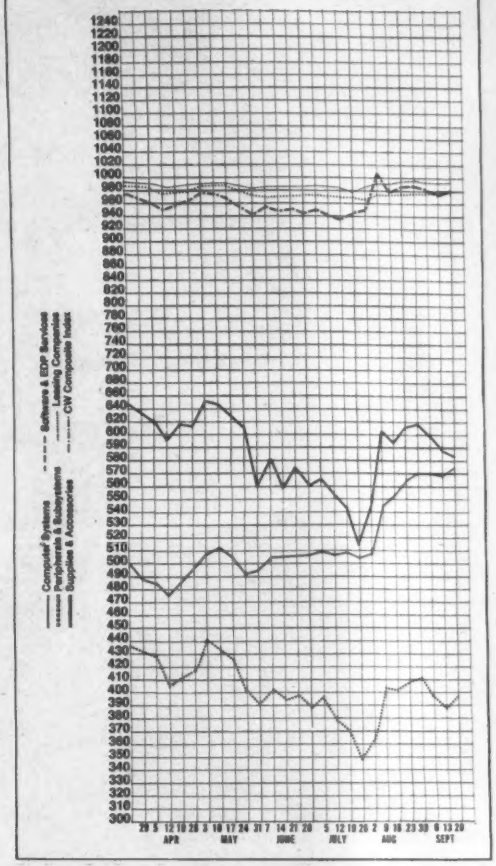
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CLOSING PRICES WEDNESDAY, SEPTEMBER 19, 1984

All statistics compiled, computed and formatted by TRADE QUOTES, INC Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALPHA MICROSYSTEMS	8- 24	8 3/8	- 5/8	-6.8
O	ALTOS COMPUTER SYST	8- 21	8 1/2	- 1/2	-5.6
A	AMDAHL CORP	10- 30	13 1/4	+ 7/8	+7.0
O	APPLE COMPUTER INC	18- 63	27	+ 7/8	+3.2
N	AT&T	19- 21	18 3/8	+ 1/2	+2.8
N	BURROUGHS CORP	44- 58	52 1/2	-1	-1.8
O	COMPUTER AUTOMATION	5- 12	5 1/2	- 1/2	-8.3
A	COMPUTER CONSOLES	14- 28	15 5/8	-1 1/4	-7.4
N	CONTROL DATA CORP	25- 62	27	- 3/8	-1.3
O	CONVERGENT TECHNOL	10- 41	14	-1	-6.8
N	CRAY RESEARCH INC	39- 58	54	- 3/8	-0.8
N	DATA GENERAL CORP	27- 58	54 3/4	+ 1/2	+0.8
N	DATAPOINT CORP	14- 31	14 1/4	- 1/2	-3.3
N	DIGITAL EQUIPMENT	84-125	88 1/4	+3 1/2	+3.8
A	ECCO INC	12- 18	12 7/8	+ 5/8	+4.7
N	ELECTRONIC ASSOC.	3- 15	4	+ 1/4	+6.8
N	FLOATING POINT SYST	13- 44	18	+ 3/4	+4.3
N	FOXBORO	29- 47	31 1/2	+ 3/4	+2.4
O	GENERAL AUTOMATION	7- 18	7 7/8	0	0.0
N	GOULD INC	24- 44	28	+ 1/8	+0.4
N	HARRIS CORP	23- 48	27 1/2	-1 3/4	-5.8
N	HEWLETT-PACKARD CO	31- 48	36 1/8	+ 1/2	+1.3
N	HONEYWELL INC	46- 88	58 3/4	+ 5/8	+1.0
N	IBM	109-134	125 7/8	+3	+2.4
O	IPL SYSTEMS INC	1- 14	3	- 1/4	-7.8
N	M/A-COM INC	13- 35	20	+ 1/8	+0.6
N	MANAGEMENT ASSIST	8- 28	27 3/4	- 1/8	-0.4
N	MATSUSHITA ELEC(ADR)	60- 88	67 3/4	+1	+1.4
N	MODULAR COMPUTER SYS	5- 16	8 3/4	+ 1/4	+2.9
N	MOHAWK DATA SCI	9- 17	13 7/8	- 1/4	-1.7
N	MOTOROLA INC	35- 68	38 1/2	-1 1/4	-3.1
N	MAT'L SEMICONDUCTOR	11- 20	12 3/4	- 3/8	-4.3
N	NBI INC	17- 38	20 1/8	+ 3/8	+1.8
N	NCR	31- 54	54	-1	-4.0
N	PERKIN-ELMER	29- 37	33 3/8	- 3/8	-2.7
N	PRIME COMPUTER INC	11- 28	18 1/2	-1 1/8	-6.3
N	SPERRY CORP	35- 50	38 3/4	- 3/4	-1.8
O	TANDEM COMPUTERS INC	15- 40	17 1/2	+1 1/4	+7.8
N	TANDY CORP	23- 62	26 7/8	+ 1/8	+0.4
O	TELEVIDEO SYSTEMS	4- 41	4	- 3/8	-8.5
O	TELXON CORP	8- 17	16 1/2	+1 3/8	+8.0
N	TEXAS INSTRUMENTS	105-168	127 1/2	- 3/4	-0.5
A	ULTIMATE CORP	13- 24	22 1/2	- 5/8	-2.7
O	VECTOR GRAPHICS INC	0- 8	3	- 1/8	-25.0
A	WANG LABS "B"	24- 42	27 3/8	+1	+3.7
A	WANG LABS "C"	24- 42	27 3/8	+ 3/4	+2.8
N	XEROX CORP	35- 92	38	+1 3/8	+3.8

LEASING COMPANIES

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	SOOTHE FINANCIAL CP	10- 22	21 1/4	+ 1/4	+1.1
N	COMDISCO INC	10- 42	13	- 1/8	-0.8
O	CONTINENTAL INFO SYS	3- 18	6 1/8	+ 1/4	+4.2
N	DPF INC	10- 19	14 7/8	+ 1/8	+0.8
O	PHOENIX AMERICAN INC	8- 17	7	- 1/8	-1.7
O	SELECTERM INC	11- 21	13 1/4	0	0.0
N	U.S. LEASING	29- 46	37 3/4	+ 1/4	+0.6

COMPONENTS

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADVANCED MICRO DEV	29- 41	37	- 1/2	-1.3
O	ADV'D SEMICONDUCTOR	16- 38	23 1/4	- 3/4	-3.1
N	ANALOG DEVICES INC	20- 32	28 1/2	- 1/2	-1.8
O	ANALOGIC CORP	10- 31	10 1/2	-1 3/4	-14.2
N	APPLIED MAGNETICS CP	9- 37	8	- 1/8	-1.3
N	TERADYNE	23- 39	28 1/4	- 2 3/8	-8.2

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON; L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	3- 8	3 1/4	- 1/2	-13.3
N	ADVANCED SYSTEMS INC	14- 22	17	- 1/4	-1.4
O	AGS COMPUTERS INC	11- 32	10 1/2	-1 1/4	-10.6
O	AMERICAN SOFTWARE	13- 31	18 1/4	+ 1/4	+1.5
N	AMACOMP INC	3- 18	2 5/8	+ 1/4	+10.5
N	ANALYSTS INTL CORP	5- 17	8 1/2	+ 1/4	+4.7
A	APPLIED DATA RES.	19- 37	23	-1 1/8	-4.8
O	BGS COMPUTER SYSTEMS	13- 21	16 1/4	-1	-5.7
S	ASTRODYNE COMP IND	1- 7	1 7/8	- 1/8	-6.2
N	AUTOMATIC DATA PROC	30- 44	38 1/2	+1 1/8	+2.9
O	CGA COMPUTER ASSOC	9- 17	12 1/8	+ 1/8	+1.0
O	COMPUTER ASSOC INT'L	19- 39	18 1/2	+1	+5.7
O	COMPUTER HORIZONS	8- 20	5 3/4	- 1/4	-4.1
O	COMPUTER NETWORK	9- 11	8 7/8	+1 3/4	+24.1
N	COMPUTER SCIENCES	11- 23	14 3/8	0	0.0
A	COMPUTER TASK GROUP	12- 18	13	- 1/4	-1.9
O	COMPUTER USAGE	6- 18	11 3/8	+ 3/8	+3.4
O	COMPUTIME SYSTEMS	4- 23	6 1/8	+1 3/8	+29.9
O	COMSERV COMP	1- 18	3	+ 3/8	+14.2
O	COMSHARE	7- 14	8 1/8	+ 1/8	+1.5
N	EULLINET SOFTWARE	24- 50	44 1/4	- 1/4	-0.5
O	EVCARE SYSTEMS INC	16- 25	20	- 5/8	-3.0
N	ELECTRONIC DATA SYST	25- 46	40 1/8	+ 3/4	+1.8
O	HOGAN SYSTEM INC	10- 27	12 3/4	- 1/2	-3.7
N	GENERAL ELECTRIC CO	49- 59	58 3/8	- 3/4	-1.3
N	ICC CORP	36- 48	40 7/8	+1 1/8	+2.8
N	INFORMATICS GENERAL	15- 32	15 3/4	- 3/4	-4.5
O	INFORMATION SCIENCE	5- 17	9 1/4	+ 1/2	+10.3
O	INFOTRON SYSTEMS CP	24- 43	27 1/2	+1 1/2	+5.7
O	KEANE ASSOCIATES	8- 15	12	0	0.0
A	LOGICON	18- 31	27 3/4	- 3/4	-2.6
O	MCI COMMUNICATIONS	6- 28	7	- 3/8	-5.0
O	MNGT SCI AMER INC	11- 33	12 1/4	+ 1/2	+4.2
O	MATHEMATICA APP GRP	5- 18	8 1/2	0	0.0
O	MICOM SYSTEMS INC	21- 50	37 1/4	+1 1/4	+3.4
O	MONCHIK-WEBER CP	8- 22	14 3/8	+ 1/4	+1.7
O	NATIONAL DATA CORP	8- 28	8 3/4	-4 1/2	-33.8
O	ON-LINE SOFTWARE INT	0- 28	7 1/2	0	0.0
O	PANSOPHIC SYSTEMS	11- 30	10 7/8	-1 1/8	-9.3
N	PLANNING RESEARCH	12- 21	12 7/8	+ 3/4	+8.1
O	POLICY MGMT SYSTS CP	22- 38	28 1/4	+1 1/4	+4.6
O	PROGRAMMING & SYS	4- 8	4 7/8	0	0.0
O	REYNOLDS & REYNOLD	29- 53	32 1/2	-1	-2.9
O	SEI CORP	12- 34	12 1/4	-1 1/4	-9.2
O	SHARED MEDICAL SYST	23- 43	26 3/8	+1 1/8	+4.4
O	SCIENTIFIC COMPUTERS	0- 14	3 3/4	0	0.0
O	SOFTWARE AG	8- 13	13 7/8	+ 1/8	+0.8
N	URS CORP	10- 18	12 3/4	+ 1/4	+2.0
N	UCCEL	7- 17	11 1/4	+1 1/4	+12.5

PERIPHERALS & SUBSYSTEMS

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
P	AM INTERNATIONAL	2- 7	3	- 1/4	-7.8
A	ANDERSON JACOBSON	7- 28	8 1/2	- 1/4	-3.7
O	AUTO-TROL TECHNOLOGY	10- 29	13 1/4	- 3/4	-5.3
O	AVANT-GARDE COMPUTING	15- 29	23 3/4	-1 1/4	-5.0
O	BANCTEC INC	5- 22	7	+1 3/4	+33.3
A	BEEHIVE INT'L	2- 15	2 3/8	0	0.0
N	BOLT,BERANEK & NEW	17- 30	22 1/4	- 1/8	-0.5
O	CAMBEX CORP	1- 3	2	- 3/8	-17.8
N	CENTRONICS DATA COMP	9- 28	10 1/2	+1 3/4	+20.0
A	CETEC CORP	7- 12	8 3/8	+ 5/8	+7.1
A	COGNITRONICS	4- 20	9 1/8	+ 3/8	+13.5
O	COMPUTER DEVICES INC	1- 1	1 1/4	+ 1/8	+100.0
O	COMPUTER TRANSCEIVER	2- 10	1 3/4	0	0.0
N	COMPUTERVISION CORP	29- 93	48	+1 1/8	+2.3
N	COMRAC CORP	11- 24	13 7/8	+ 3/8	+2.7
A	DATAPRODUCTS CORP	16- 32	22 3/4	- 1/8	-0.5
A	DATARAM CORP	5- 12	6 7/8	- 1/4	-4.8
O	DATA SWITCH CORP	6- 41	8	-1	-14.2
O	DATUM INC	6- 17	9 7/8	- 1/2	-7.8
O	EMERSON DATA COMPUT	9- 18	12 1/2	+ 3/8	+3.0
O	DOCUTEL-OLIVETTI	5- 38	5	- 1/4	-4.7
N	ELECTRONIC M & M	5- 11	7 1/8	- 1/4	-3.3
O	EMDATA INC	9- 18	8 1/2	+ 1/2	+6.2
O	EVANS & SUTHERLAND	13- 39	26	+4	+20.0
O	GANDALF TECHNOLOGIES	8- 14	13 1/8	0	0.0
N	GEN'L DATA COMM IND	10- 20	18 7/8	+1	+5.2
O	GREAT SOUTHWEST IND	1- 2	1/2	0	0.0
N	HAZELTINE CORP	18- 33	28	-1 3/4	-5.8
O	ICOT CORP	3- 8	3 3/4	- 1/4	-6.2
O	INFORMATION INTL INC	10- 18	11	+ 1/4	+2.3
O	INTEL CORP	27- 49	31 1/4	-2 1/2	-7.4
A	LUNDY ELECTRONICS	7- 18	8 7/8	+ 1/8	+1.4
O	MEGADATA CORP	8- 19	13 3/4	+ 1/4	+1.8
A	MDI DATA CORP	2- 22	11	+1 3/4	+18.8
N	MAGNUM CORP	10- 28	25 3/4	+ 1/8	+0.4
O	NETWORK SYSTEMS CORP	16- 34	24 7/8	- 1/8	-0.5
N	NO AMERICAN PHILIPS	30- 46	37 1/4	+ 7/8	+2.4
N	NORTHERN TELECOM LTD	30- 48	39 1/2	+1 3/8	+3.6
O	OMEX	1- 8	1 1/8	0	0.0
N	PARADYNE CORP	12- 28	12 1/2	-1 3/8	-8.8
A	PENRIL CORP	8- 14	12 3/4	+ 1/8	+0.9
O	PHOENIX AMERICAN INC	8- 17	7	- 1/8	-1.7
N	PLESSEY CO (ADR)	25- 41	28	+ 3/4	+2.9
O	PRINTRONIX INC	18- 36	21 1/4	+ 1/4	+1.1
O	RACAL COMP	1- 8	3	+ 1/4	+3.7
N	RECOGNITION EQUIP	10- 17	15	+ 3/8	+2.5
N	ROLM CORP	30- 89	48 1/2	+6	+8.4
N	SANDERS ASSOCIATES	38-120	44 3/4	- 3/4	-1.6
O	SCAN DATA	1- 3	3/8	0	0.0
O	SCAN-TRON CORP	9- 18	11 1/4	+ 3/4	+7.1
N	SCIENTIFIC ATLANTA	8- 23	8	0	0.0
N	STORAGE TECHNOLOGY	7- 23	11 1/4	- 3/8	-3.2
O	SYKES DATATRONICS	2- 13	2 3/8	- 1/8	-5.0
O	SYSTEMS & COMP TECH	20- 38	23	-1 1/4	-4.4
A	T BAR INC	7- 17	10 5/8	+ 1/2	+4.9
A	TAB PRODUCTS CO	13- 30	18 5/8	- 3/4	-4.3
O	TANDON CORP	7- 28	7 3/8	- 3/4	-8.2
A	TEC INC	8- 12	10 1/8	- 1/4	-2.4
N	TELETRONIX INC	52- 97	54 1/2	-2 3/4	-4.8
N	TELEX	19- 34	33 1/2	+ 1/4	+0.7
O	TERMATA SYSTEMS CP	2- 17	2 1/8	+ 1/8	+6.2
N	TIMEPLEX INC	13- 23	20 1/4	+1 1/4	+6.5
O	VISUAL TECHNOLOGY	4- 28	6 1/4	0	0.0

SUPPLIES & ACCESSORIES

E X C H		1983-84 RANGE (1)	CLOSE SEP 19 1984	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN BUS PROD	17- 33	22 7/8	+ 1/2	+2.2
N	BARRY WRIGHT	22- 33	30 3/8	-1 1/4	-3.9
A	DUPLEX PRODUCTS INC	22- 27	25 5/8	- 1/8	-0.4
N	EXMIS BUS. FORMS	18- 28	23 7/8	+ 3/8	+1.5
N	3M COMPANY	69- 96	79 3/4	+ 3/8	+0.4
N	MOORE CORP LTD	35- 51	40 1/8	+ 3/8	+0.9
O	STANDARD REGISTER	23- 43	42 1/2	+2 3/4	+6.8
N	WALLACE COMP SERVICE	23- 33	28 1/2	+ 1/2	+1.7

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